Charles E. Kellogg

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1945. Quebec, Canada. Organization of FAO. October 14 - November 2.

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* Lucille 1. Kellogg also.

1949. Australia. January 4 (with brief visit in Hawaii) - January 31.

1949. New Zealand. February 1 - (with brief stop in Hawaii) February 27.

1950.* Europe - Ireland, Portugal, France, Belgium, Netherlands, U.K. and Iceland. June 24 - September 5.

1951. Canada (Northern Saskatchewan and Alberta). August 18 - September 11.

1952. Israel. April 30 - May 16.

1952. U.K., especially Scotland. May 17 - May 27.

1954. Africa, especially Belgian Congo. (Also Gold Coast, Belgium, and U.K., briefly). August 1 - September 19.

1956.* Europe, including France (ISSS), Italy, Switzerland, Belgium, and U.K. August 5 - September 17.

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Charles E. Kellogg

ALASKA JOURNAL

July - August, 1946

by

Charles E. Kellogg

After an extremely busy 10 days getting my affairs in shape to leave, and with a sore back, I leave by air from the Washington airport at 5:15 p.m. July 5, along with Magruder and Ellis.

We stop for a few minutes at Toledo, Chicago, and other airports, and reach Seattle about 9:00 a.m. Saturday July 6. Since our reservations are not clear out of Seattle, we wait over there Sunday. This time I spend mostly in trying to recover some sleep (which I can't get at night sitting up in a plane) and resting my sore back. We receive assurances, however, that Pan American will have us in Fairbanks, Alaska by Monday afternoon.

U. S. DEPARTMENT OF THE INTERIOR

THE ALASKA RAILROAD

SCENIC ROUTE TO
MT. MC KINLEY NATIONAL PARK
AND INTERIOR ALASKA

SCALE OF MILES
50 0 50 100 200 300

ROUTE BY PLANE
ROUTE BY MOTOR (PRINCIPAL ONES)
ROUTE BY RAIL

NOTE: Those who do not desire to make the Palmer side trip may ıain in Anchorage until 2:00 p.m.

Day, SATURDAY—Leave Curry 7:45 a.m. Arrive McKinley Park 11:40 a.m. Headquarters, Mt. McKinley National Park Hotel, at Park entrance.

Day, SUNDAY—In McKinkley Park. Motor trips listed below.

h Day, TUESDAY—Leave McKinley Park. Continue rail trip northward at 7:30 a.m. Arrive Fairbanks 11:55 a.m.

In Fairbanks. Side trip by automobile to the University of ıska, flower gardens, U. S. Agricultural Experiment Station, ms, dredge and placer gold mining operations and throughout city.

Leave Fairbanks at 9:00 p.m. via The Alaska Railroad. Arrive nana at 10:55 p.m. and transfer to the River Steamer "Yukon."

h Day, WEDNESDAY—Begin cruise down the Tanana and up the kon Rivers.

During the following seven days passengers will be cruising surely on the Tanana and Yukon Rivers, making stops at Tanana, mpart, Fort Yukon, Circle City and Eagle. Just before reaching rt Yukon the Arctic Circle will be crossed.

h Day, WEDNESDAY—Arrive Dawson, scene of intense activity during the thrilling "Klondike" gold rush days; headquarters, the Hotel Royal Alexandra. A visit to the log cabin home of Robert W. Service, and an automobile side trip to nearby points of interest and placer mining operations.

h Day, THURSDAY—Board river steamer and continue the cruise up the Yukon River, making stops at many interesting settlements and passing through the famous "Five Finger Rapids."

h Day, TUESDAY—Arrive Whitehorse. Leave Whitehorse 10:00 a.m. via the W. P. & Y. Railway, and arrive Carcross at 12:10 p.m. Board the Steamer "Tutshi" for an afternoon sail on a beautiful chain of lakes to Ben-My-Chree Homestead at the head of West Taku Arm. Lunch, dinner, berth and breakfast on the steamer.

h Day, WEDNESDAY—Arrive Carcross in the morning. Leave Carcross at 11:10 a.m.; lunch at Lake Bennett, and arrive Skagway at 3:15 p.m. Headquarters at either of the following hotels: Golden North, Pullen House or the White House.

h Day, SUNDAY—Board steamer in the evening and begin the return trip to Seattle via the Inside Passage, making stops at Juneau, Sitka, Petersburg, Wrangell and Ketchikan.

h Day, SATURDAY—Arrive Seattle during the morning.

COSTS

amship fare between Seattle and Seward, minimum, including transportation, meals and stateroom accommodations..	$ 70.00
il fare, Seward to Nenana via Fairbanks. (If trip Matanuska to Palmer and return is included the extra fare will be 55 cents)	31.70
ver steamer, Nenana to Whitehorse, with first class berth and meals; rail, Whitehorse to Skagway; lake steamer, Carcross to West Taku Arm and return, with first class berth and meals (if West Taku Arm side trip not included, fare will be $15.00 less)	125.00
amship fare, Skagway to Seattle, minimum, including transportation, meals and stateroom accommodations	52.50
tel rooms and meals that are not included in above items (estimated)	57.00
	$336.20

See McKinley Park trips following "All Rail Tour."

SIDE TRIPS

Anchorage: By auto, to Lake Spenard Bathing Resort and around the Loop Highway	$ 3.50
Fairbanks: By auto, sightseeing trip to the University, Farm Road, Agricultural Experimental Farm, Gold Dredges, Ester Creek and Airport	3.00
By auto, to Circle Hot Springs and return (meals and lodging extra)	22.50
Continuing to Circle City and return to Hot Springs	5.00

rangements may be made for flights to remote points by airplane.

The trip Seattle to Seward and return, with one week devoted to the "All-Rail" tour Seward to Fairbanks and return via The Alaska Railroad (described on pages 3 and 16), can also be made in approximately nineteen days.

Either twenty-three or thirty-five days from Seattle, Vancouver, or Prince Rupert, and return thereto, are required in connection with Alaska's "Yukon River Circle Tours" outlined on pages 8 and 17, the length of time depending upon route followed—whether "upstream" or "downstream" —the former requiring a few days' more time.

LOWER YUKON RIVER SERVICE

During the season of navigation, The Alaska Railroad maintains freight and passenger steamer service on the Tanana and Lower Yukon rivers, to Holy Cross and Marshall. At the last-named point this service connects with the launch "Encee" of the Northern Commercial Company, which plys between Marshall and St. Michael. Nome connections are made at St. Michael.

"Alaska is a paradise for photographers, amateurs or professionals. The people were just grand."

"We had a hard time getting accustomed to daylight all night. Mt. McKinley was simply gorgeous by night as well as by day."

Frost-bound Salmon Craft
Sharp

July 8: Seattle to Fairbanks

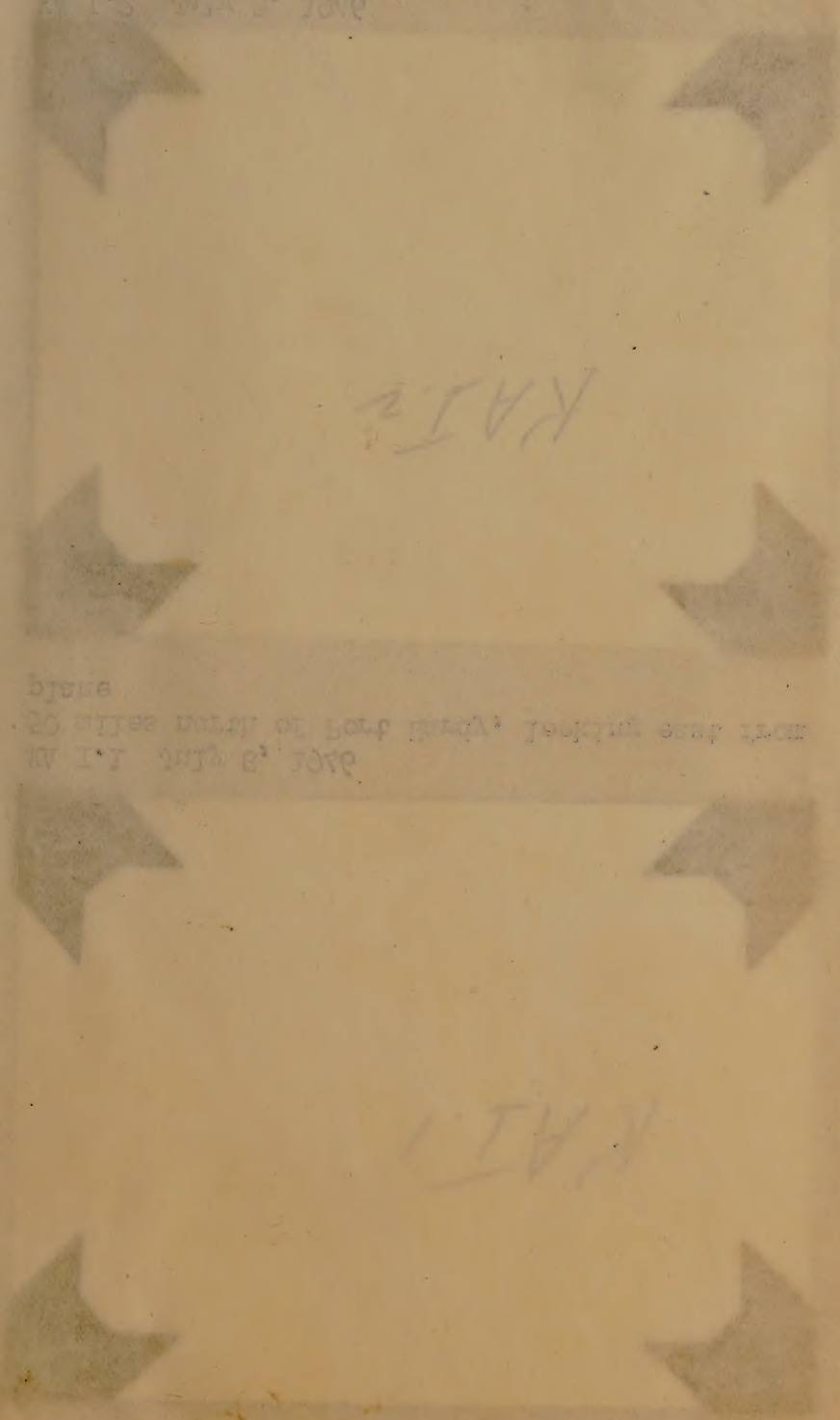
I am up, sore back and all, at 4:45 a.m. After several delays we finally leave Seattle at 7:00 a.m., in the rain. It is a comfortable 2-motored plane. We fly over a dense cloud bank nearly to Port Hardy. Now we can see water and islands in Queen Charlotte Strait. There are many small rocky islands with steep sides and thin forest. The mainland is still obscured by clouds. As we come down at Port Hardy, the land seems to be essentially all forested with only a few small clearings. Clouds are low but discontinuous. I can see some new clearing, probably to expand the airport, but the land appears to be quite rough, except for a very narrow, irregular coastal strip. Our pilot overshoots the air strip and we make an extra circle to land at 9:12 a.m.

The airfield at Port Hardy is on an imperfectly drained gravelly terrace. The soil is young - a Brown Forest or Brown Podzolic cobbly loam with a suggestion of the brown B_2 of a Podzol. The matrix of well-rounded cobbles, largely of light-colored rocks, is too coarse for the soil to be of agricultural use. One sees many ferns and wild flowers.

We get away at 9:30 a.m. About 50 miles north of Port Hardy I try some pictures (foolishly). Near Spider Island I see snow-covered ridges in the background with tops at a remarkably uniform level. The coast is a complicated pattern

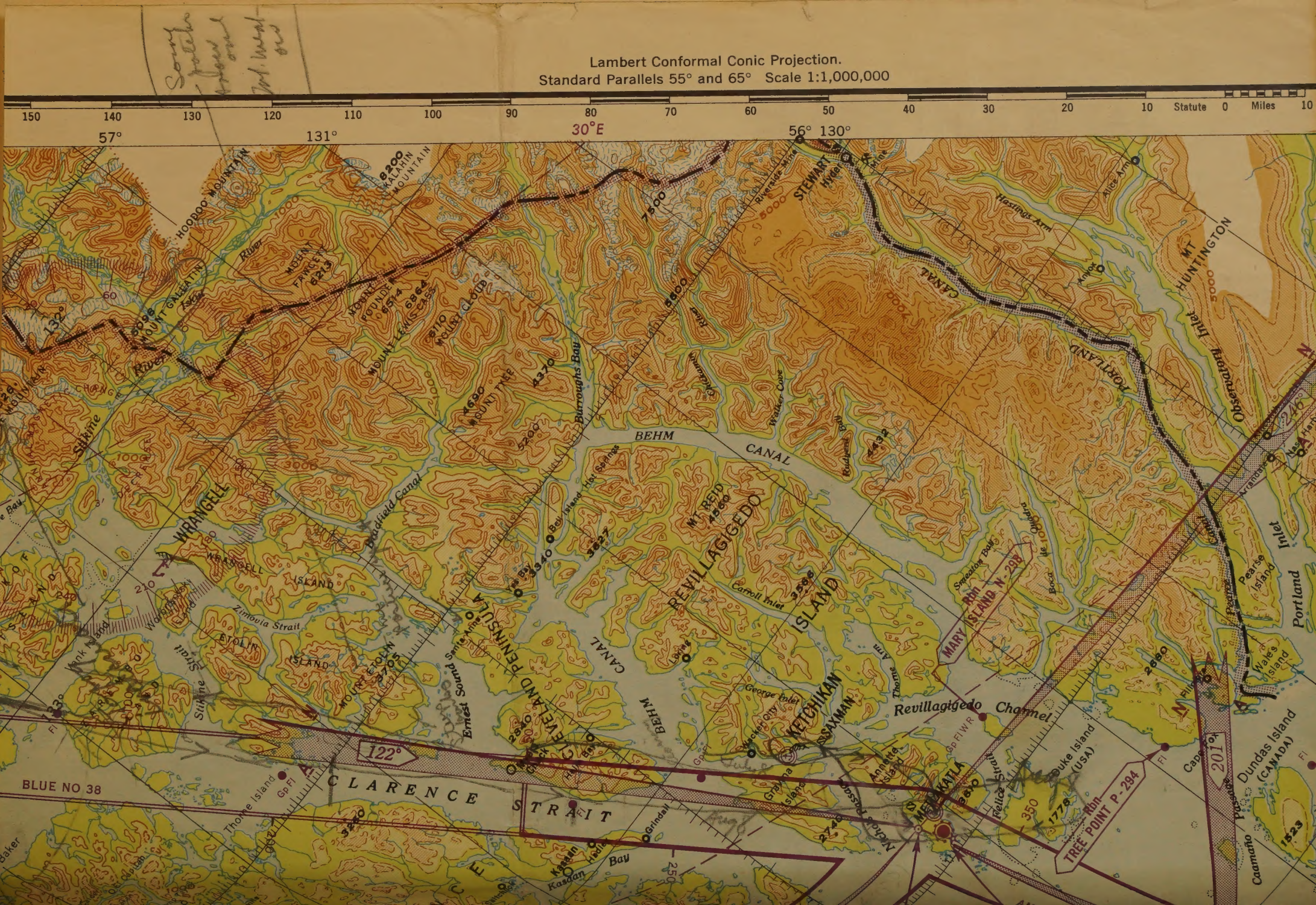
KA I.1 July 8, 1946
50 miles north of Port Hardy, looking east from plane

KA I.2 July 8, 1946
50 miles north of Port Hardy, looking east from plane.



100 90 80 70 60 50 40 30 20 10 Statute 0 Miles 10
133° 132° 56°
PRINCE OF WALES ISLAND
CLARENCE STRAIT
BEHM CANAL
REVILLAGIGEDO CANAL
ANNETTE ISLAND
DUKE ISLAND
GRAVINA ISLAND
REVILLAGIGEDO ISLAND
CORDOVA BAY
ANNETTE RADIO KG-266
AMBER NO 1
BLUE NO 3
ANNETTE ISLAND LF 396 126.18 Mc
Annette Tower
Rbn LF-396
MARY ISLAND M-298
TREE POINT P-294
TRIPLE ISLAND Q-308
RED ROUTE ND-23
DANGER AREA
FRONTIER AREA
TERRANCE CONTROL
Ketchikan
Saxman
Thorne Arm
Sealevel Mine
Boca de Quadra
Pearse Canal
UNITED STATES
ALASKA
BRITISH COLUMBIA
CANADA
PORTLAND INLET
Observatory Inlet
Arrandale
Kincolith
Nass Harbor
Somerville Island
Wales Island
Fillmore
Zarembo Island
DUNDAS ISLAND
CHATHAM CHANNEL
Cape Chacon
Cape George
Goschen Island
PORCHER ISLAND
BROWNING ENTRANCE
Ogden Channel
Hill Point
Grenville Channel
Port Simpson
Prince Rupert
Kwinitsa
Skeena River
Exstew
Ecstall River
Port Essington
Kennedy Island
Clarence Strait
Nichols Passage
Fence Reef
Caamano Point
Gp Fl
Gp Fl (WR)
Rbn
Fl
ANNUAL MAGNETIC CHANGE

Arnold Gesell

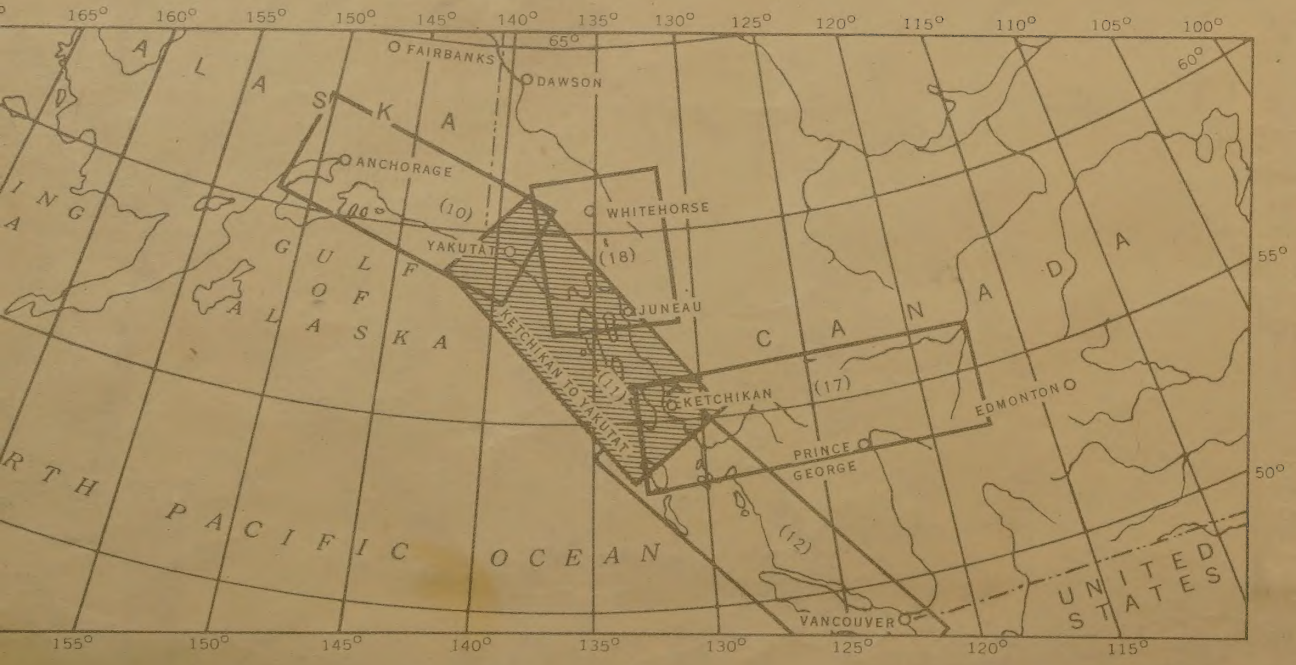

Lambert Conformal Conic Projection.
Standard Parallels 55° and 65° Scale 1:1,000,000
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 Statute 0 Miles 10
57° 131° 30°E 56° 130°
HOOBOO MOUNTAIN
KALAHIN MOUNTAIN
MOUNT GALEATIN
MOUNT FAWLEY
MOUNT FOUNDER
MOUNT LEWIS CASS
MOUNT CLOUD
MOUNT TATE
Stikine River
Burroughs Bay
Bradfield Canal
WRANGELL
WRANGELL ISLAND
Zimovia Strait
ETOLIN ISLAND
MOUNT ETOLIN
Ernest Sound
Sarkar Anne
PETERSBURG PENINSULA
Bay Island
Hot Springs
BEHM CANAL
REVILLAGIGEDO ISLAND
MT REID
Carroll Inlet
Walker Cove
Eulachon Bay
Thorne Arm
George Inlet
Wacker City
KETCHIKAN
SAXMAN
Revillagigedo Channel
Annette Island
Gravina Island
Nichols Passage
METLAKATLA
Duke Island (USA)
Revilla Strait
Tree Point
Dundas Island (CANADA)
Pearse Island
Wales Island
Portland Inlet
Observatory Inlet
Hastings Arm
Alice Arm
Riverside Mine
Hyder
STEWART
PORTLAND CANAL
MT HUNTINGTON
Thorne Island
Grindall Island
Kasaan Bay
Kasaan
Baker
Caamaño
MARY ISLAND N-298 Rbn
TREE POINT P-294 Rbn
BLUE NO 38
122°
132°
Gp Fl
Fl
Gp Fl WR
Gp Fl WR

AAF FLIGHT CHART

KETCHIKAN TO YAKUTAT, ALASKA
F.C. 11

Note: Officers using this chart will mark hereon corrections
and additions which come to their attention and mail direct to
AERONAUTICAL CHART SERVICE, HEADQUARTERS ARMY AIR FORCES, WASHINGTON, D. C.

LOCATION INDEX



AERONAUTICAL SYMBOLS

LANDPLANE FACILITIES

SEAPLANE FACILITIES

AUTHORIT

A.A.F. Aeronautical Charts, 1:1,000,000, Sheets: 117, 138, 139, and 168
Regional Aeronautical Charts, 1:1,000,000, Whitehorse, 85M and Frase
Aeronautical Charts of Alaska, 1:1,000,000, St. Elias, 1943, and Ketchik
A.A.F. Tri-Metrogon Photography, Compilation by Aeronautical Chart
Canada, National Topographic Series (Air Nav. Ed.), 1:506,880, Dept. o

Scale 1:1,000,000 or 1

20 0 20

10 0 10 20

10 0 10 20 30

AERONAUTICAL

of fiords and islands. Most of the beaches are very narrow or don't exist at all. Some of the islands, Price for example, appear to be low and swampy. All are densely forested.

Our AAF flight chart (May 1946) is not very accurate. Many islands and channels are not shown. I see a most excellent spit on the northeast corner of Graham Island, which reminds me of the one at Duluth. We are down on Annette Island, near Ketchikan, at 11:50 a.m.

The airport is a cobbly, or rather "fine" stony, marine terrace, with angular stones of both light and dark-colored rocks. The soil has a deep, matted A_0, a brown B_2, and some evidence of the Podzol A_2. Although fairly well drained, the soil approaches a Half-Bog. There are many sedges, including cotton grass. We are away again at 12:15 p.m.

I get a glimpse of Petersburg and a fine view of Baird and North Baird glaciers. Here also the coastal beach is exceedingly narrow. I see a few habitations southwest of Petersburg. Near Petersburg I see some nice mountain meadows, but most of the land below the glaciers is jagged and covered with forest. There are several beautiful old cirques. On the northwest slopes of steep peaks, south of Juneau, there are patches of snow and beautiful mountain meadows. There is only a little bare land, and that on the very steepest peaks.

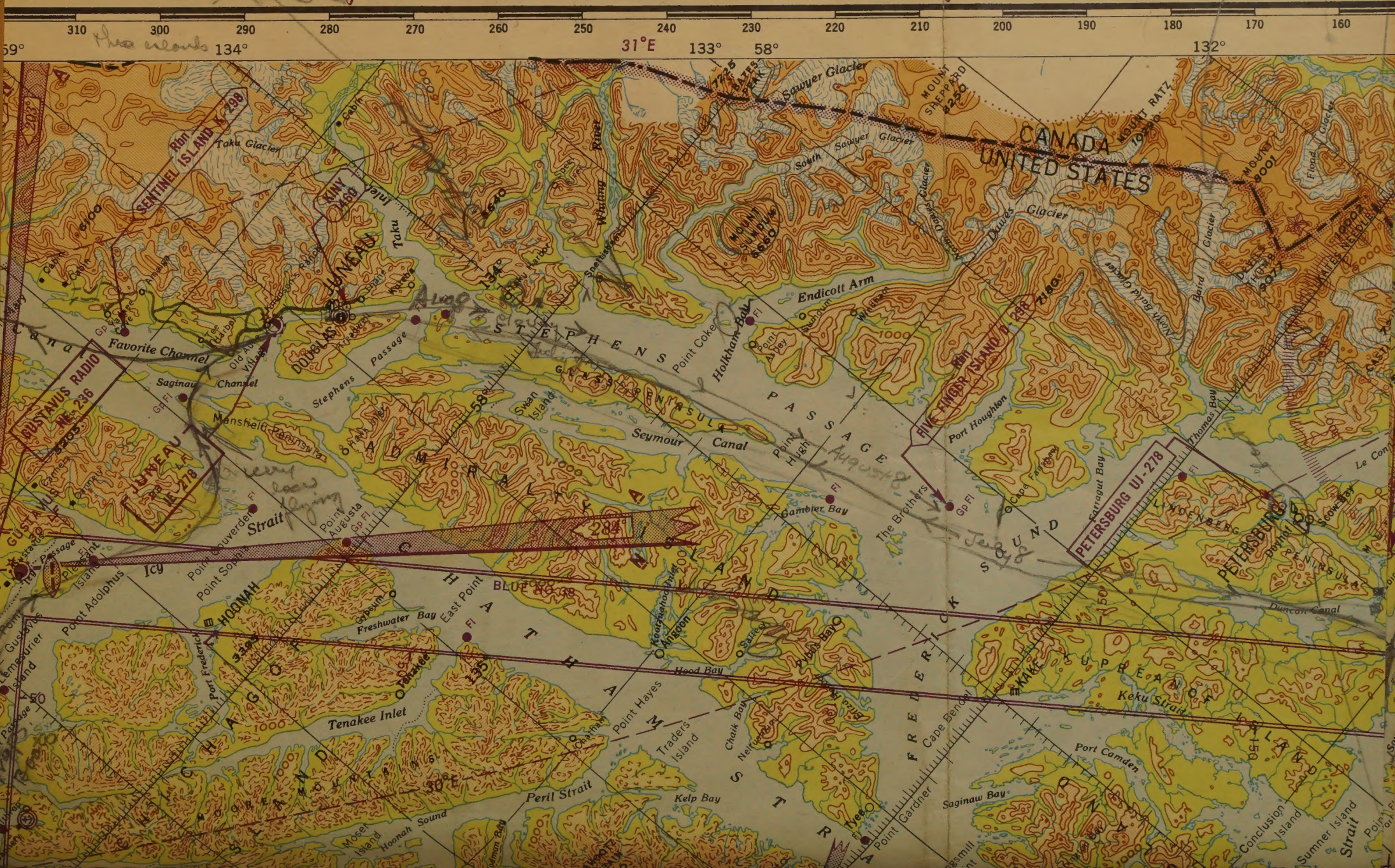
KA I.3 July 8, 1946
Annette Island (near Ketchikan). Cleared land near airport. Half-Bog on stony marine terrace.

KA I.4 July 8, 1946
75 miles north of Juneau. Junction of two glaciers.

KAI-3

KAI-4

AAF FLIGHT CHART


CANADA
UNITED STATES
Sawyer Glacier
South Sawyer Glacier
Dawes Glacier
North Baird Glacier
Baird Glacier
Florid Glacier
MOUNT SHEPPARD 9250
MOUNT RATZ 10,190
MOUNT 9001
MOUNT SUMDUM 5660
MOUNT 7425
BATES PEAK
DEVILS THUMB 9077
MATES NEEDLE 10,002
Endicott Arm
Holkham Bay
Point Coke
Point Astley
Sumdum
Whidbey
Point Cokett
Port Houghton
Thomas Bay
Cape Fanshaw
Garragut Bay
Le Conte
Snowslide
Duncan Canal
Keku Strait
Port Camden
Saginaw Bay
Cape Bendel
Point Gardner
Conclusion Island
Sumner Island
Strait
Point
Kake
Kupreanof Island
Frederick Sound
Stephens Passage
Admiralty Island
Chatham Strait
Icy Strait
Glacier Bay National Monument
Juneau
Douglas
Taku Inlet
Taku Glacier
Sentinel Island
Favorite Channel
Saginaw Channel
Gustavus
Gustavus Radio
Menshefi Peninsula
Swan Island
Seymour Canal
Point High
Gambier Bay
The Brothers
Five Finger Islands
Petersburg
Lindenberg Peninsula
Point Augusta
Point Soberanof
Point Couverden
Strait
Port Adolphus
Pleasant Island
Freshwater Bay
East Point
Hoonah
Tenakee Inlet
Port Frederick
Point Hayes
Traders Island
Chalk Bay
Peril Strait
Kelp Bay
Hoonah Sound
Moser Island
Pavlof Bay
Kadashan Bay
Kadashan River
Kadashan Lagoon
Saook Bay
Neruda Bay
Hood Bay
Basket Bay
Yes Bay
Kye
Point Augusta
Point Soberanof
Point Couverden
Point Adolphus
Icy Strait
Strait
Pleasant Island
Port Frederick
Tenakee Inlet
Hoonah
Peril Strait
Hoonah Sound
Moser Island
Kelp Bay
Chatham Strait
Point Hayes
Traders Island
Chalk Bay
Neruda Bay
Hood Bay
Basket Bay
Yes Bay
Kye
Pavlof Bay
Kadashan Bay
Kadashan River
Kadashan Lagoon
Saook Bay

ES

S. Coast and Geodetic Survey, 1943.
iver 76M, U.S. Coast and Geodetic Survey, 1942.
, 1942, U.S. Coast and Geodetic Survey.
vice (U.S. Geological Survey) 1943.
Mines and Resources, 1942-43.

h = 15.8 miles

60 80 Kilometers

40 50 60 Nautical Miles

50 60 70 80 Miles

YMBOLS

CITIES AND TOWNS

NEW YORK — METROPOLITAN AREAS (500,000 & OVER)

RICHMOND — LARGE CITIES (100,000 TO 500,000)

ARLINGTON — CITIES (25,000 TO 100,000)

SANGATE — SMALL CITIES (10,000 TO 25,000)

Corville — LARGE TOWNS (5,000 TO 10,000)

Arcola — VILLAGES & TOWNS (LESS THAN 5,000)

HIGHWAYS AND ROADS

PRIMARY ROADS

SECONDARY ROADS

TRAILS

78 — U. S. ROAD MARKERS

50 — NATIONAL, STATE OR PROVINCIAL ROAD MARKERS

CULTURAL AND MISCELLANEOUS

T——T——T — POWER TRANSMISSION LINES

T T T T T — TELEPHONE & TELEGRAPH LINES

DAMS

• OR ■ — LOCATED OBJECTS (WITH EXPLANATORY NOTE)

• 5268 — HIGHEST ELEVATION ON CHART

• 5248 — SPOT ELEVATIONS (IN FEET)

MINES & QUARRIES

)(— MOUNTAIN PASSES

LOOKOUT TOWER

FORTS

PIPELINES

RACE TRACKS

STATE & INTERNATIONAL BOUNDARIES

RAILROADS (SINGLE TRACK)

RAILROADS (DOUBLE TRACK)

Siding / Siding — RAILROAD SIDINGS

RAILROADS (ABANDONED)

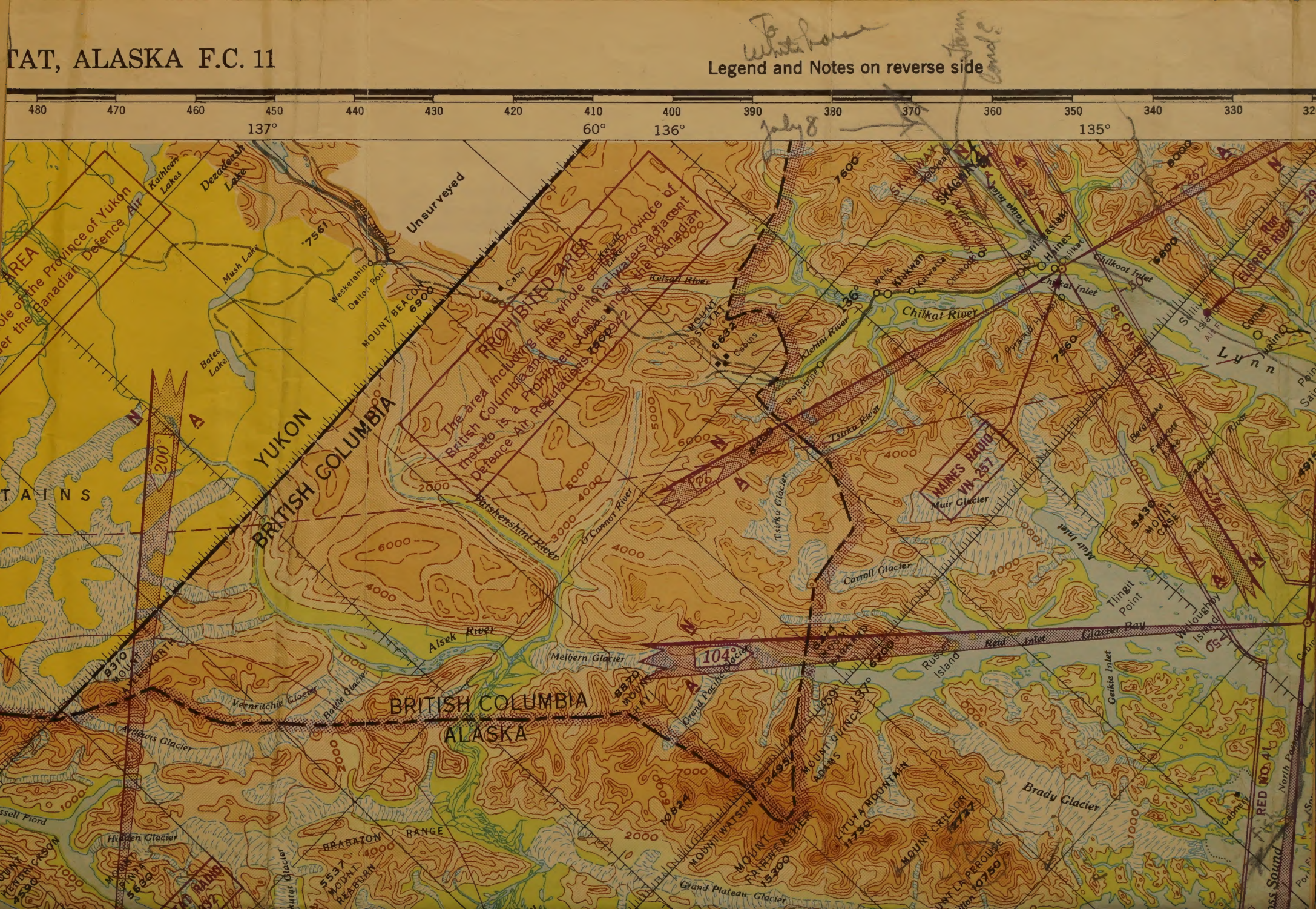
RAILROAD OVERPASS

RAILROAD UNDERPASS

BRIDGES (HIGHWAY)

BRIDGES (RAILROAD)

TUNNELS (RAILROAD OR HIGHWAY)


TAT, ALASKA F.C. 11
Legend and Notes on reverse side
480 470 460 450 440 430 420 410 400 390 380 370 360 350 340 330
137° 60° 136° 135°
PROHIBITED AREA
The area including the whole of the Province of British Columbia is a Prohibited Area under the Territorial Waters Adjacent thereto is a Prohibited Area under the Canadian Defence Air Regulations
Province of Yukon
Canadian Defence Air
Unsurveyed
YUKON
BRITISH COLUMBIA
ALASKA
Kathleen Lakes
Dezadeash Lake
Mush Lake
Bates Lake
Wesketahin
Dalton Post
MOUNT BEAC
Kelsall River
Cabin
Mount Scott
Klukwan
Chilkoot Inlet
Chilkat Inlet
Chilkat River
Haines
Skagway
Lynn Canal
Klehini River
Tsirku River
Tsirku Glacier
Muir Glacier
Muir Inlet
Carroll Glacier
Berg Lake
Berg Bay
Tlingit Point
Glacier Bay
Reid Inlet
Russell Island
Geikie Inlet
Brady Glacier
Grand Plateau Glacier
Melbern Glacier
Alsek River
Vernrütchie Glacier
Battle Glacier
Brand Pacific Glacier
Hidden Glacier
Mount Watson
Mount Fairweather
Mount Quincy Adams
Lituya Mountain
Mount La Perouse
Mount Crillon
Brabazon Range
Mount Reaburn
Mount Cason
Mount Wright
Mount Lituya
Mount Case
Patsheshnint River
O'Connor River
Pyramid Peak
Berg Lake
Eagle Glacier
Haines Radio
Yakutat Radio
Red Mountain
Eldred Rock
Sullivan Island
Seagull
Naloughby Island
North Pinnacle
Pass Sound
Port Frederick
Cabin
Camp
Airfield
Trail
Pipeline
Power Line
Boundary
Glacier
Lake
Mountain
Peak
Cabins
Post Office
Radio Station
Radio Beacon
Airport
Light
Fog Signal
Buoy
Anchorage
Rock
Reef
Shoal
Kelp
Sunken Rock
Foul Ground
Fathoms
Feet
Meters
Statute Miles
Nautical Miles
Kilometers
Scale
Contour Interval
Datum
Projection
Compiled
Published
Edition
Surveyed
Revised
Corrections
Notices to Mariners
Chart Number
Sailing Directions
Tide Tables
Current Tables
Light List
Radio Aids
Caution
Danger
Prohibited
Restricted
Anchorage Area
Traffic Separation Scheme
Inshore Traffic Zone
Precautionary Area
Deep Water Route
Two-Way Route
Recommended Track
Ferry Route
Submarine Cable
Submarine Pipeline
Dredged Area
Wreck
Obstruction
Underwater Rock
Foul Area
Kelp
Seaplane Anchorage
Quarantine Anchorage
Explosives Anchorage
Small Craft Facilities
Boat Harbour
Boat Ramp
Slipway
Jetty
Pier
Wharf
Quay
Breakwater
Groyne
Training Wall
Dolphin
Mooring Buoy
Navigation Buoy
Lateral Buoy
Cardinal Buoy
Isolated Danger Buoy
Safe Water Buoy
Special Purpose Buoy
Beacon
Daymark
Light
Fog Signal
Radio Beacon
Racon
Radar Reflector
Radar Station
Radio Direction Finder Station
Coast Guard Station
Pilot Station
Customs
Immigration
Quarantine
Harbour Master
Port Authority
Police
Hospital
Clinic
Dentist
Doctor
Veterinarian
Chemist
Post Office
Telegraph
Telephone
Radio
Television
Newspaper
Library
Museum
Art Gallery
Theatre
Cinema
Concert Hall
Opera House
Stadium
Racecourse
Golf Course
Tennis Court
Swimming Pool
Yacht Club
Rowing Club
Sailing Club
Motor Boat Club
Fishing Club
Hunting Club
Shooting Club
Camping Ground
Caravan Park
Picnic Area
Youth Hostel
Hotel
Motel
Guest House
Boarding House
Restaurant
Cafe
Bar
Public House
Night Club
Casino
Bank
Money Exchange
Travel Agency
Shipping Agency
Ship Chandler
Boat Builder
Boat Repairer
Boat Hire
Boat Sales
Fishing Tackle
Fishing Gear
Fish Market
Fish Processing
Fish Canning
Fish Freezing
Fish Smoking
Fish Drying
Fish Salting
Fish Meal
Fish Oil
Fish Glue
Fish Manure
Fish Feed
Fish Farming
Fish Hatchery
Fish Ladder
Fish Pass
Fish Trap
Fish Weir
Fish Net
Fish Line
Fish Hook
Fish Spear
Fish Gaff
Fish Knife
Fish Scale
Fish Tail
Fish Fin
Fish Head
Fish Eye
Fish Mouth
Fish Gill
Fish Scale
Fish Tail
Fish Fin
Fish Head
Fish Eye
Fish Mouth
Fish Gill

AERONAUTICAL CHART SUPPLY

(Ref: AAF Reg. 65-82, dated 26 Apr., 1944)

1. Aeronautical charts, maps and publications distributed by Aeronautical Chart Service are indexed or listed in the current edition of the AAF "Catalog of Aeronautical Charts and Related Publications." Miscellaneous maps and charts not appearing in the Catalog will be procured and furnished by Aeronautical Chart Service through special order, when sufficiently identified in requisitions as to name or number, scale, projection, and publisher if known.

2. Requisitioning.

a. Outside Continental United States:

(1) AAF activities are to submit requisitions to the supply facility designated by the Theater Commander for maintenance and distribution of aeronautical charts and maps.

(2) Theater supply facilities are to submit requisitions for replenishment of stocks of aeronautical charts and maps through channels to Headquarters AAF, Aeronautical Chart Service, Washington, D. C.

b. Within Continental United States: Requisitions from AAF activities within Continental United States are to be submitted to appropriate Regional Store as shown on Aeronautical Chart Supply System geographic diagram in AAF Aeronautical Chart Catalog. Except when emanating from an Air Force, Wing, or Command Headquarters, requisitions are to bear the signature or approval by indorsement of the Base or Station Operations Officer. Quantities of charts and maps requested are to be such as to assure the maintenance of a 30-day supply at all times but not to exceed a 60-day supply.

3. Obsolete Charts.

a. Aeronautical charts rendered obsolete-for-air by a revised edition, when not practicable to correct for conformity with new edition, are to be salvaged if feasible, or else destroyed. Disposition by salvage or destruction is to be made in accordance with provisions of AR 380-5.

We come into Juneau at 1:48 p.m. (and set watches back an hour). As we come in we see many little icebergs in the water. At the airport one has a nice view of Mendenhal Glacier. Cows pasture on the coastal flats near the airfield. But there isn't room for much agriculture. We get away again at 1:20 p.m.

There is much snow in the mountains; and I see some beautiful glaciers about 75 or 100 miles north of Juneau. The upper part of the mountains now are nearly bare of any vegetation. One can see many little glaciers and cirques. As we turn more inland, the plane gets rough and we run into little showers. The vegetation is becoming thin everywhere, even on the lower slopes. About 120 miles out, most of the land is bare - gray with some red - and the peaks are very jagged, although they reach about the same level. The prettiest cirques appear to face the east.

As we cross into Canada, the land is not so rough and there is more vegetation.

Our pilot has trouble getting down at Whitehorse, overshoots the airfield several miles, and makes several turns before we finally land at 2:45 p.m.

KA I.5 July 8, 1946
About 100 miles north of Juneau, en route to Whitehorse. Mountain glaciers.

KA I.6 July 7, 1946
East of Big Delta, looking east of Indian Village

KA I.8 July 8, 1946
Northeast of Big Delta. Indian Village.

KA I.6 July 7, 1946
East of Big Delta, looking east of Indian Village

KA I.C July 8, 1946
Northeast of Big Delta. Indian Village.

We leave again at 3:00 p.m., which is 2:00 p.m. Fairbanks time.[1] (We are making much time - to lose later.)

Trees are thin in the valleys and on the lower slopes. Most hills are rounded and fairly well covered with plants, although there are a few bare spots.

Beyond Big Delta we see much more forest. We are down at Fairbanks about 4:45 p.m. where we are met by Mr. Edgar, Mr. Prince, Director Oldroyd, and others. We are taken to a newly built one-story hotel called the Cheechako (= "new comer").

I have a small room, rather far from the bath. Like all cheaply[2] constructed buildings of this sort, it is noisy. The "quiet hour" of 10:00 p.m. is poorly observed, partly because it doesn't get dark at all this time of year. Dr. Aamodt and the others come in about 9 o'clock from Nome and we have a general discussion of the work until midnight. Everyone seems very interested in the job ahead.

I go to bed finally after a hard 22-hour day. I know I have a back tonight!

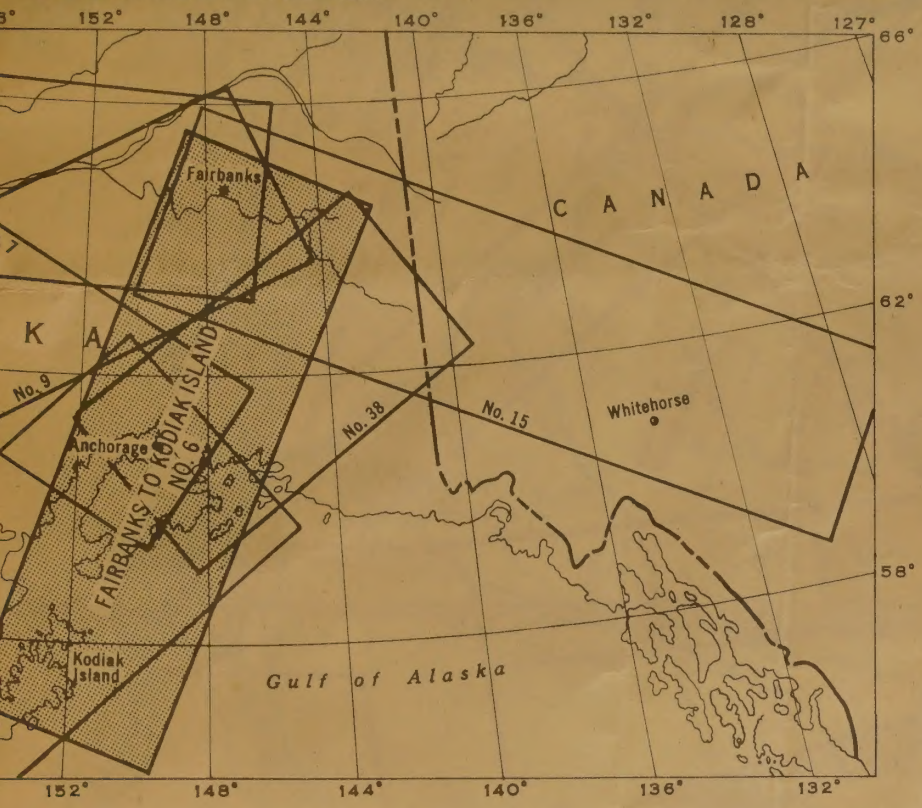
1/ Whitehorse to Fairbanks to Nome is covered, in reverse, in Notes on Visit to the Soviet Union. 1945. q.v.

2/ I should say "lightly" constructed: nothing is "cheap" in Alaska, except mosquitoes, scenery, and blueberries (on the bush).

KFAR
660
Fairbanks
DF
MILE 26
LF
644
278
126.18 Mc
Satellite Tower
Chena River
Bartlett
College
Marion
Cache
Ester
Weeks Field
LF
435
GREEN NO 7
Minto Lakes
Minto
Muskeg
Standard
California
Dunbar
Berg
THE ALASKA
RED NO 39
215°
Wood River
Salena
122°
NENANA
360 LF
Nenana
Mahon
NENANA RADIO
NG-236
Ruffus
Cabin
BLUE NO 26
SLED ROAD
302°
Clear
Kobe
Browne
4760
Liberty Bell
Mines
Moss
Ferry
Lignite
Suntrana
Healy
HEALY NO 2
600
Moody
Cabin
Toklat River
Tekland River
Nenana River
Minchumina
McKINLEY PARK
1730
McKinley Park
Yanert River
Yanert Glacier
Cabins
Little Moose Creek
5850
FANG MTN
7001
Carlo
Wingo
POLYCHROME PASS
Cantwell
Summit
SUMMIT
2418 LF
Broad Pass
150°
Colorado
Sullivan
HONOLULU PASS
Honolulu
Hurricane
Chulitna
UNSURVEYED AREA
Muldrow Glacier
Eldridge Glacier
McKINLEY
20,300
SUMMIT RADIO
JD-326
191°
351°
Cabins
Panguingue
5070
Little Delta River
Delta Creek
East Fork
7400
MT DEBORAH
12540
HESS MTN
12030
MT HAYES
13740
RANGE
ALASKA
Yanert Glacier
West Fork Glacier
Susitna Gl
East Fork
MONAHAN FLAT
SLED ROAD
Denali
Nadiwen Lake
148°
DEADMAN MOUNTAIN
5560
Susitna River
Watana Creek
MT WATANA
6320
Susitna River
Salcha River
Salcha
Cabins
Salcha Lake
Dry Creek
93°
AMBER NO 2
BIG DELTA RADIO
JD-379

TO KODIAK ISLAND, ALASKA
NO. 6

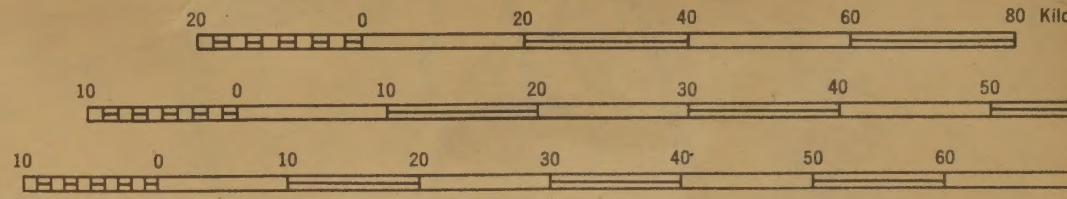
LOCATION INDEX



Supplementary data from A A F Aeronautical Charts compiled by U.S.C. & G.S., 1:1,000,000, Mt. McKinley, No. 118, 1943, Yukon River, No. 77, 1943, Peel River, No. 78, 1943, Wrangell Mountains, No. 117, 1943, Gulf of Alaska, No. 137, 1943; A A F Aeronautical Approach Charts (First Proofs), compiled by U.S.G.S., 1:250,000, 77 C I, 77 C III, 77 C IV, 78 D IV, 117 A II, 117 D I, 117 D IV, 118 B III, 118 C I, 118 C II, 118 C IV, 136 B II, A A F Aeronautical Approach Charts compiled by U.S.C. & G.S., 1:250,000, 136 B III, 136 B IV, 136 C I, and 136 C II, 1943.

NOTE: Officers using this chart will mark hereon corrections and additions which come to their attention and mail direct to "HEADQUARTERS, AERONAUTICAL CHART SERVICE, ARMY AIR FORCES, WASHINGTON, D. C."

Scale 1:1,000,000 or 1 inch = 15.8 miles



RONAUTICAL SYMBOLS

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ACILITIES) ___

OR LOGISTIC __
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SEAPLANE FACILITIES

SEAPLANE BASE-MILITARY (COMPLETE FACILITIES) __

SEAPLANE BASE-CIVIL (COMPLETE FACILITIES) ____

SEAPLANE BASE-JOINT MILITARY & CIVIL _____
(COMPLETE FACILITIES)

SEAPLANE AIRPORT-MILITARY _____
(REFUELING & LIMITED REPAIR FACILITIES)

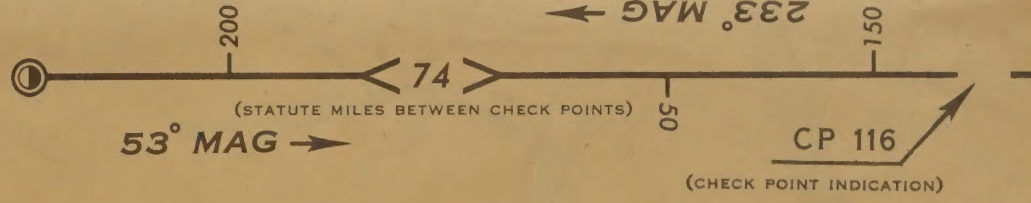
SEAPLANE AIRPORT-CIVIL _____
(REFUELING & LIMITED REPAIR FACILITIES)

SEAPLANE AIRPORT-JOINT MILITARY & CIVIL ____
(REFUELING & LIMITED REPAIR FACILITIES)

SEAPLANE EMERGENCY ANCHORAGE _____
(LIMITED OR NO FACILITIES OR LOGISTIC INFORMATION NOT AVAILABLE)

AERONAUTICAL SYMBOLS

FLIGHT LINE ← MARRAKECH—MEKNES 216 S M →



CIVIL AIRWAY (WITH FLIGHT LEVELS INDICATED) _____ (traffic controlled) 8000

July 9: Agricultural Experiment Station at University of Alaska and Farmers' Meeting

Even though I'm up early, the sun is already high in the sky. We eat at the Model restaurant, which caters to heavy eaters and charges accordingly. Of course, we don't ask the price, because that would give us away as new comers. For transportation we have an army surplus "pick-up," borrowed from the college, and an exceedingly hard riding "command" car from the Army.

With Iver (Dr. Nygard) and some of the others I go out toward the University and Experiment Station, where I had been almost exactly one year ago. On the way, I take a picture of the Creamer dairy farm - the largest in Alaska. This sort of picture often appears as a typical Alaska farm, which, of course, it is not. The owner does well, however, furnishing milk at high prices, locally and to the Army. Most people in Alaska are resigned to canned milk. One finds a can on every restaurant counter and table, along with sugar (never rationed in Alaska), salt, and pepper. The sourdoughs are said to prefer it to fresh milk now.

At first, of course, Director Oldroyd (of both Experiment Station and Extension Service) takes us into see President Bunnell, just as he did a year ago. As before, the president complains about all the difficulties with the Army, the legislature, and so on. This is apparently due, in part at

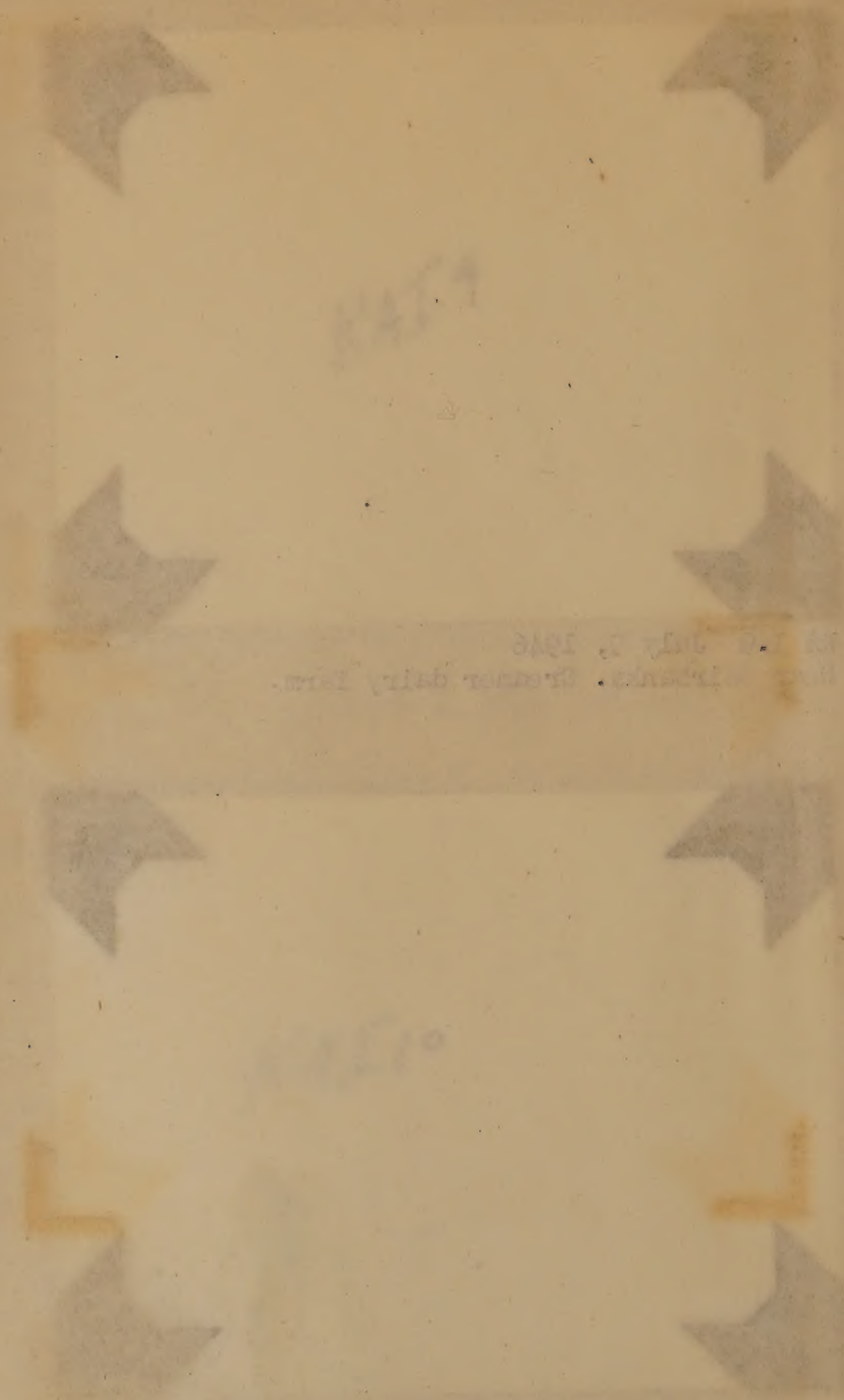
least, to his habit of taking personal responsibility for every detail himself. Director Oldroyd seems rather timid and has little to say in the presence of President Bunnell. The President is excited over the prospect of a big geophysical research unit, financed by the Congress. This would be a fine thing for the University and for science, if competently organized. He is interested in agriculture along 2 lines: (1) To get more food raised by the Experiment Station for his student boarding house, and (2) to get more people in Alaska (and especially in the Tanana Valley). He obviously has had little experience that would give him a clear concept of how agricultural research must be conducted to attack fundamental farm problems in Alaska. Besides, I suspect that he may have a private ax to grind in his attitude toward settlement, but I am not sure what it is. Certainly he has worked very hard to maintain the University and deserves much credit for it.

Now we go to see the President's garden, which Director Oldroyd praises very highly. It is fairly good, but not so good as the President conceits it to be (nor so good as Director Oldroyd's). We also see the President's paintings - he has some nice ones by now famous Alaska artists.

Next we see Director Oldroyd's garden. He rents an abandoned section house from the Alaska Railroad where he lives with his family. He keeps chickens. His garden is on the Fairbanks

KA I.9 July 9, 1946
Near Fairbanks. Creamer dairy farm.

KA I.10 July 9, 1946
Near Alaska Experiment Station. Director Oldroyd's garden on lower slope of Brown Forest soil developed from wind-blown very fine sand over schist.



KA I.11 July 9, 1946
Near Alaska Experiment Station. Another view of Oldroyd's garden.

KA I.11

KA I.11 July 9, 1946
Fort Alaska Experiment Station. Another view of
Stefford's garden.

KA I.12 July 9, 1946
Near Alaska Experiment Station. Close view of natural ground cover near Oldroyd's garden.

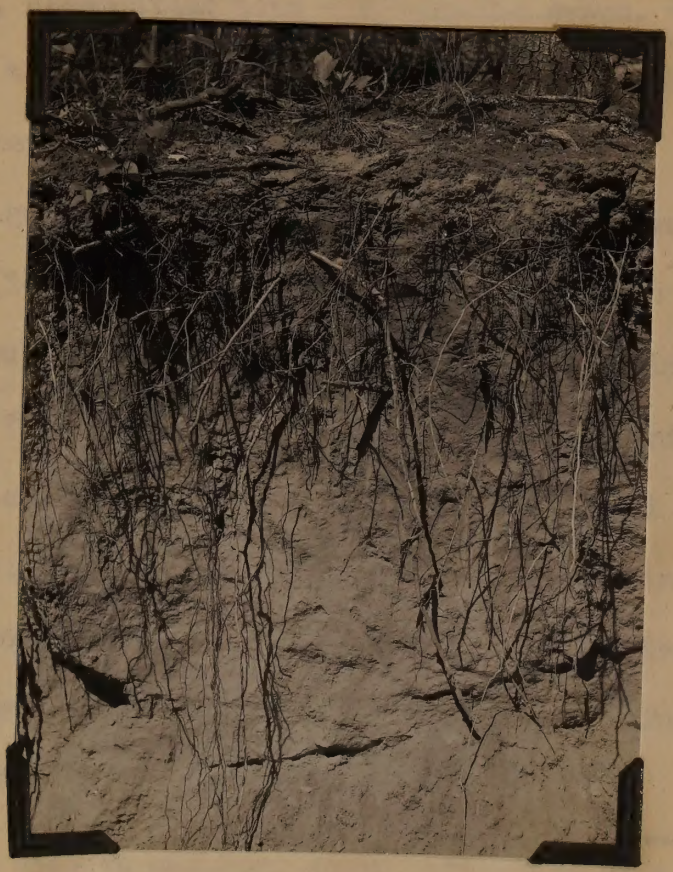
KA II.1 July 9, 1946
Near Alaska Experiment Station. One of Oldroyd's gardens on recently cleared Fairbanks very fine sandy loam.

very fine sandy loam - a young Brown Forest soil developed from wind-blown material over schist. The garden is large and excellent, on the whole. Obviously it requires a very large part of the Director's time and energy.

Over the fence I look at the native vegetation on the same kind of soil. The ground cover (KA I. 12) consists of blueberries (a little different from those in the Lake States), Labrador tea, mountain or low-bush cranberry (very good and require less sugar than our common cranberry), dwarf dogwood, and crowberry (Empetrum nigrum). The slope here is about 5%. The vegetation after fire, including this ground cover, has quacking aspen, white spruce, white birch, etc., with small white spruce coming up. (KA II. 2)

We go over the plots at the Experiment Station rather rapidly with Dr. Benzin - an ecologist of Russian origin. I do not take detailed notes, since Aamodt will, and mainly keep in the way of Benzin's continual fire of words about the plants he has under observation. He obviously works under enormous handicaps, without equipment or labor. He has many promising wheats and barleys. I am especially impressed by the Siberian red clover (if seed can only be obtained at reasonable cost), perennial vetch, and yellow-blossom Siberian alfalfa. He is also experimenting with some high-nicotine tobacco sent up from the U.S.D.A. (Over the irrigation of this he and the Director appear to have words !)

KA II.2 July 9, 1946
Near Alaska Experiment Station. Native vegetation after fire on Fairbanks very fine sandy loam.



KA II.3 July 9, 1946
At Alaska Experiment Station. A cut in Fairbanks very fine sandy loam.

By now my back is so sore I rest a bit. I sit in Benzin's little cabin (he has no proper house or laboratory) and we discuss the philosophical basis of ecology and agricultural geography for a half hour.

We drive back of the station grounds and take a look at a field that was cleared 20 years ago when it was a smooth gentle slope. About 12 years ago blocks of ice in the permafrost layer began to melt, because of greater heat penetration with cultivation. As a result, the field is now too hilly - with short, steep-sided pits - to use for crops. 1/ This melting of the permafrost is often a problem on the uplands above the terraces.

Often gullies are started - gullies that have little or no deposition out of them. There is one such on the station farm (although Director Oldroyd insists that it is an ordinary gully !). These gullies often look quite like ordinary gullies and may later become erosion channels. The field in which this gully is found is quite strongly sloping. Certainly this Fairbanks soil would be expected to be very erosive, especially in the spring just as the surface thaws. Strong slopes must be protected.

1/ My best picture was spoiled by taking one of a patch of marquis wheat on the same film !

KA II.5 July 9, 1946
On Alaska Experiment Station. Land cleared about 20 years ago. This micro-relief started to form about 12 years ago as a result of melting ice in permafrost. Now useless for crops. Mainly Fairbanks very fine sandy loam.

KA II.6 July 9, 1946
On Alaska Experiment Station. Edge of gully in Fairbanks very fine sandy loam caused by melting ice in permafrost.

KA II.7 July 9, 1946
On Alaska Experiment Station. Beginning of gully in Fairbanks very fine sandy loam, probably caused by melting ice in permafrost. Started about 2 years ago.

We return to our hotel and rest a few minutes. After dinner we attend a meeting of farmers in the Tanana Valley as their guests. After a brief explanation (excellently made by Dr. Aamodt) of our purpose, the various individuals give their suggestions. On the whole, they give these in a most helpful and thoughtful spirit. A rough summary of their suggestions, with some necessary rearrangement, follows. Of course, they do not confine themselves entirely to research. About 40 farmers, or part-time farmers, speak. Some have large outfits while others have only a few acres without even a road to their places. Some have brought specimens; in fact, one gives me a nice box of home-grown strawberries.

The first 16 items are mentioned by several people, but the order of listing is only roughly in accord with the emphasis placed on them by farmers.

1. Central storage needs and farm storage, especially of potatoes.

2. Soil classification in reference to opening new land and especially as to applicability of various farm practices and adaptability of crops and varieties of crops on both old and new land. They say that without soil maps they cannot use the results of successful farmers safely. How about supplemental "quick tests?" (The wide interest and general understanding of detailed soil classification among these farmers amazes me.)

3. Roads to the farms. Several must now pack on their backs a part of the way all or part of the time.

4. Water supply: How locate wells, especially in upland? (Much complicated by permafrost.) Use of water for irrigation. Filtration for home use. Freezing of wells through permafrost (even in summer).

5. Problem of fruit varieties and culture - strawberries, cranberries, raspberries, etc., including disease control.

6. Weed problem - several kinds of weeds.

7. Potato varieties are confused. Also need work on wire worms and other pests.

8. Fertilizers are needed for most crops, but optimum ratios and rates for various soil types are unknown. With proper soil classification, new farmers can make use of the experience of old farmers. Need fertility trials.

9. Food quality: Composition of locally grown foods; storage; preservation; present diets. (Obviously, many have read the recent literature of the "newer" nutrition and are worried, because they don't know the quality of their produce.)

10. Greenhouse construction and use for economy and effectiveness.

11. Need more dependable sources of grain, legume, and vegetable seeds. Seeds now often germinate poorly and are frequently wrongly labeled.

12. Something must be done about mosquitoes near homes and in work areas. 1/

13. Land clearing: cost, effectiveness, effect on soil organic matter.

14. Insulation of buildings. Use of sawdust in concrete, or other methods.

15. Farmer cooperatives: organization, scope, and management.

16. Hay drying - or alternative methods of storage.

17. Beef cattle and hog feeding and housing.

18. Marketing methods: grading, etc.

19. Credit facilities to fit local needs (without relief features).

20. How use and conserve manure without increasing weeds?

21. How raise tomatoes out-of-doors: culture, variety?

22. Could not a lot be gained by careful collection and analysis of the experience of farmers in northern Europe and Asia?

23. Soil erosion problem on the uplands (Fairbanks very fine sandy loam, mostly), especially as related to permafrost and to spring thaws.

24. Poultry growing the year around. Can chicks be grown locally?

1/ I find later that such research is now under way and seems very promising.

12. Something must be done about soil conditions near house and in work areas. 1/

13. Land clearing: cost, effectiveness, effect on soil organic matter.

14. Insulation of buildings. Use of sawdust in concrete, or other methods.

15. Farmer cooperatives: organization, scope, and accomplishments.

16. Hay drying - or alternative methods of storage.

17. Beef cattle and hog feeding and housing.

18. Marketing methods: grading, etc.

19. Credit facilities to fit local needs (without relief features).

20. How use and conserve energy without increasing work.

21. How raise tomatoes out-of-doors: culture, variety

22. Could not a lot be gained by careful collection and analysis of the experience of farmers in northern Europe and Asia?

23. Soil erosion problem on the uplands (Fairfield very fine sandy loam, mostly), especially as related to pasture and to spring flows.

24. Poultry growing the year around. Can chicks be grown locally.

1/ I find later that such research is now under way and seems very promising.

25. Hormones to stimulate rapid early growth of fruits and vegetables.

26. Would goats be better than cows, especially because of the winter feed problem?

27. Rabbit farms: disease and nutrition.

It is implied throughout, I believe, that testing and breeding of new varieties of grains, vegetables, and fruits should be pushed for earliness, quality, and hardiness.

The problem of permafrost will be met partly through extensive researches under way now by the War Department and planned by the U. S. Geological Survey

The U. S. Geological Survey should be asked to give attention to the matter of local water supply in the uplands. It is an urgent matter that may make or break many a settler.

From what I have seen so far, I am much impressed with the collective ideas of these farmers. I should have rated the weed problem and the erosion problem during spring thaws a little higher than they do. But they may be correct. We shall see. One farmer brings samples of fine wheat, barley, alfalfa, and strawberries.

Throughout there is an undercurrent - rather strong - against the University. It is felt that the Experiment Station is not getting at the problems, fundamentally, as they exist in Alaska. This view is understandable to me from what I experienced this morning (and one year ago).

I walk back from the meeting in nice twilight about midnight, eating strawberries and looking at several nice gardens on the way. Such gorgeous delphiniums! And many other nice flowers and vegetables. But the roads are not oiled or paved and dust is everywhere. There is no wind in Fairbanks. Part of the way I have concrete walks, part board walks, and part earthen paths.

Finally to bed about 1:00 a.m., after about 15 minutes to straighten my back and another 15 to get off the floor and into bed.

the alaska farmer

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VOL. I — JULY, 1946. — NUMBER 7.

Scientists Study Alaska Agriculture

During the past month nine scientists have arrived in the Interior Alaska. They are carrying on an experimental investigation of agricultural problems and will report back to Congress in regards to more intensive and extensive research work needed in Alaska.

The present group will lay the groundwork for a development program to follow after Congress has received and considered their report. They have been very active and very busy from early morning until very late at night. Because of the light nights we have here in the Interior they do not know when to call it a day. One of the scientists remarked that the midnight sun deceives one of the actual hour and one would not be aware of the time without a watch or a stomach to indicate the time.

Dr. O. S. Aamodt, head of the group, said in explaining that the purpose of this party was to study the needs of a more intensive research program. This would include soils and related problems as to the drainage, cultural practices and uses of fertilizers. The improvement of crops best suited to conditions in the Territory as to early maturity and high quality. The livestock problems, home-grown feed and farm structures.

A meeting of the farmers was held for the purpose of explaining to the group their needs in the development of agriculture. As stated by the farmers they need to know more about the soil, the availability of water, methods of clearing land, storage, ventilation in farm buildings, information on cattle for beef, marketing and financing. Last but not least the great need of roads. This of course, belongs to another branch of the Government but could be recommended by them in order to help the farmer. A few of the farmers stated that they had to carry their produce to the market on their backs for miles and bring back their supplies the same way, due to the lack of roads. This not only hinders the individual but the development of agriculture as well. Much of this land is very good for farming and would benefit the Territory to a great extent if areas such as these were opened up by traversable roads. The farmers are enthusiastic and willing to carry on the hardships of clearing the land and putting it into cultivation, raising crops and harvesting them for the market to meet the demand of the Alaskan population. The farmer needs roads to carry out this program.

Problems presented by the farmers were so many and varied that the specialists invited them to individual consultation at the end of the meeting for some of the answers. Also they were asked to write their pressing questions and present them to any one of the specialists who would be glad to help wherever he could.

The agronomist of the Experiment Station said Alaska's problems are not Territorial but International and that experiments are being conducted in Canada and Russia which are similar to the ones that were discussed here.

The Commissioner of Agriculture stressed the need of having available specific information on a variety of subjects so as to have adequate answers to the many questions that come to his desk.

The following four members of the group have been here three weeks:

Dr. O. S. Aamodt, crop specialist of the Bureau of Plant Industry, Washington, D.C. and head of the party.

Dr. Iver G. Nygard, soil specialist, of the Bureau of Plant Industry, headquarters at St. Paul, Minnesota.

Alfred D. Edgar, agricultural engineer specializing in storage problems, of the Bureau of Plant Industry, headquarters at Fort Collins, Colorado.

Arthur Orr, Secretary of the House Appropriations Committee, who is especially interested in the economic aspects of Alaska Agriculture.

The following five members of the group arrived this week and will remain here several days:

D. A. Savage, range specialist, U. S. Field Station, Bureau of Plant Industry, headquarters at Woodward, Oklahoma.

Dr. Charles E. Kellogg, soils specialist, Bureau of Plant Industry, headquarters at Beltsville, Maryland.

Dr. Roy Magruder, vegetable and fruit specialist, Bureau of Plant Industry, headquarters at Beltsville, Maryland.

Dr. Ned Ellis, livestock nutrition specialist, Bureau of Animal Industry, headquarters at Beltsville, Maryland.

Dr. Harry Kemper, veterinarian, Bureau of Animal Industry, headquarters at Alberquerque, New Mexico.

Wild Strawberries A Real Treat

Dr. Aamodt, Robert Savage, A. D. Edgar, specialists who are with the U. S. Department of Agriculture from Washington, D. C., and Mr. G. W. Gasser, Alaska Territorial Commissioner of Agriculture, stationed at Fairbanks, recently went out on a survey trip of the Big Delta region. They stopped at the Alaska Fire Control Station at Jarvis Creek where Mr. and Mrs. John Howard reside. Mrs. Howard gave them a very pleasant surprise by serving a delicious WILD STRAWBERRY SHORTCAKE for their lunch. The size of these berries were that of a garden pea. The many hours spent in gathering these berries make it a much more appreciated cake and one that cannot be duplicated in many parts of Alaska. She reported to them that she had canned 50 quarts of such berries last year for their winter use.

There is a destiny that makes us brothers;
None goes his way alone;
All that we send into the lives of others
Comes back into our own.
—Edwin Markham.

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EDITORIAL

Value of Ecological Data

How easy it is to forget exact data. Most of all about the weather and correlated crop observations.

Beginning this spring Dr. Basil M. Bensin has kept a day by day record of seasonal advance as evidenced by the plant life at the University Experi ment Station. Just when the grass begins to grow, the first pasque flower to bloom and the day the birch trees leaf out, are definite harbingers of spring and fix the date of its advent irrespective of the fancy colored wall calendar.

These ecological recordings, now appearing in Jessen's Weekly, in the course of a few years are the most accurate indicators of the progress of plant life throughout the growing season. Average dates for planting, progressive growth and harvesting are easily made from a series of such data. What is more, important weather cycles can be plotted which show the EXTREMES, the unusually favorable and the unfavorable seasons. The extremely dry, cold, wet, long or short summers. It is the extreme weather condition that ruins crops and puts a mortgage on the farm. Every farmer knows what an average year will produce, but the prudent man will be prepared for the off-type season, a cold late spring, a hot dry summer or whatever the years may bring.

We hope this data will be recorded over a long series of years.

Fairbanksan Devotes Time To Plants And Shrubbery As Hobby

For many years, as a hobby, Mr. T. M. Hunt of Fairbanks has carried on very extensive and intensive tests of various shrubs and flowering plants. He retired for the second time from the U. S. Land Office in November 1945 of which he had been in charge since May 12, 1923.

In 1930 he started to introduce and develop roses, lilacs, lilies, peonies and many other varieties of flowers, shrubs and trees. He is still carrying on his experiments with many beautiful plants and fruit trees as well. Many years of hard work and persistency has proved that a number of exotic plants are hardy here.

His home which is located in the western part of the city of Fairbanks has won admiration by passers-by. Blooming flowers and shrubs are to be seen from early spring to late fall.

Mr. Hunt has been very generous in giving time and knowledge to the public so as to help others benefit by his experiments which have taken many years as well as money to carry them out. His kindness has been appreciated by many.

We will try and give you a few of the many plants and shrubs he has established and that are growing and blooming in his yard.

Roses: The Rugosa and its hybrids have given best results. George Wills, Rugosa Red, Rugosa White, (Species); Hansa, hybrid Rugosa; Amelie Gravereaux, hybrid Rugosa and several others that are not so promising. Betty Bland is another promising rose.

Lilacs: Common purple, common white. Several French hybrids are not a success. While they will grow and vegetate, they will winter kill.

Pocohontas which is winter hardy is an early and good bloomer. Another is the Hiawatha which is a late bloomer and a shy bloomer. There are two others, the Assessippi and the Minnehaha which has not been proved as hardy at the present time.

Peonies: Martin Khusak is a dark red and almost a black in color just as it begins to open. Not so hardy and has to be handled carefully and coddled a little. Many others of the red, white and pink winter nicely. Slow to establish and if allowed to sulk they quickly deteriorate.

Lilies: The Azalea Lily is pretty strongly established. Coral Lily and Golden Gleam are two other good bloomers. Some mature seed, others produce abundant bulbils in the leaf axils and still others develop bulblets on the stems.

Siberian Pea Tree makes a wonderful hedge. The Lorbergii Pea Tree has a drooping bushy growth.

Tartarian: Bush Honeysuckle, Silverberry, Servicberry and Siberian Flowering Almond have been established and are very beautiful.

Western Chokecherry has done well and produces fruit which can be eaten.

The May Day Tree is another that is very beautiful and produces fruit that is not edible.

Manchurian Pear Tree is winter hardy and is busy growing but bears no fruit as yet. It is 5 to 6 years old.

Cherry Plum Tree bore fruit the first year but then winter killed.

Amur Maple is another tree that is growing well and gives promise of success.

Hanson's Anoka Apple has been growing here for several years. Some small fruits have appeared occasionally. Others report the Anoka Apple only partly hardy and no fruit. The Russian White Apple, Russian Pie Cherry and a few others were received and planted this summer. Consequently their winter hardiness is still unknown quantity.

Daphne mezereum, a close relative of the Garland Flowers but not evergreen, has wintered and blossoms well. It is the very first flower to bloom in the early spring. Just as soon as the sun begins to shine to any advantage, this bush starts to burst forth into flower. This year it bloomed May 4.

Giant Hybrid Delphiniums are perfectly hardy and do exceptionally well, both single and double white and the black bee, growing 8 to 9 feet tall.

The foregoing is not a complete list of plants which have established themselves with reasonable promise of success but it serves to indicate the range of possibilities along several lines through untiring efforts and patience such as given by Mr. Hunt. Also many hours and many dollars have been spent to accomplish these experiments for the benefit of those who love flowers and trees.

Rats Harmful To Livestock And Eat Up Feed

A booklet issued by the United States Department of the Interior states: "Veterinarians are finding that diseases and fatalities among domestic animals and livestock are more prevalent where rats are plentiful, and close attention is given the rat in connection with livestock diseases, including white scour in calves, mastitis, ringworm, contagious abortion, tuberculosis, abortion in mares, joint ill in foals and others. No owner of valued livestock or domestic animals should take unnecessary chances of losing them through disease transmitted by rats, when keeping the rats out would remove the possibility."

Fifty pounds of grain or its equivalent is required to maintain a rat for one year, and an additional 100 pounds is wasted per rat. Nineteen thirty-four statistics showed a total loss of 189 million dollars by rats annually.

HOUSE-HOLD SIFTINGS

Spiced Cranberries

2 cups sugar
1 cup water
2 two-inch sticks of cinnamon
1 teaspoon whole cloves
2 tablespoons lemon juice
Grated rind of one lemon
4 cups fresh cranberries

Combine the sugar, water, spices, lemon juice and rind and boil for five minutes. Add cranberries and cook slowly, without stirring until all the skins pop open. Chill before serving.

Kitchen Capers

Beets and red cabbage will stay ruby red if you drop a little lemon juice or vinegar into the cooking water before you add the vegetables.

Try putting prune whip on a slab or piece of spice cake.

Wash Day Tips

Clean the rollers of your wringer with a little gasoline, then wash it off with hot water.

Dirt will be much easier to wash out of curtains if half a cup of salt is added to the soaking water.

First Aid

To halt a sneezing attack, slowly swallow three or four tablespoons of milk.

A small amount of lard or butter rubbed on a bruise immediately will prevent discoloration.

Did You Know—

That window shades can be cleaned easily and beautifully with wallpaper cleaner.

That dirt will slide off a waxed dustpan more easily than an unwaxed one.

That if you slightly dampen the string before tying up mailbound packages there's less chance of it coming loose in transit. The string, you see, shrinks a little as it dries.

Teakettles and double boilers sometimes boil dry if you don't watch them. But if you put a metal jar top in the bottom it will give a warning rattle before this can happen so you can let it boil without giving it a thought.

A funnel makes an excellent rack for holding an inverted angel cake pan while the cake is cooling. Turn the funnel upside down and fit the small end into the tube of the inverted cake pan.

By putting cranberries through a meat chopper before cooking, you may avoid straining them, and they will furnish more sauce.

Greenhouse Tomatoes

There are many small greenhouses in Fairbanks and other Alaskan towns. Most of them are given mainly to the production of tomatoes. Generally speaking, the results are good to excellent.

From the owners of several greenhouses have come calls for help. More this year than usual. In several instances, diseased plants were found, some of a nutritional or physiological nature, others having a virus incidence.

The nutritional unbalance arose in several instances by an over amount of chicken manure, which does not supply a balanced food to the tomato plant. Hen manure without litter has a ratio of 1.00% nitrogen to .35% phosphorous to .33% potash. Whereas a well balanced fertilizer would have a ratio of 1% nitrogen to 2.5% phosphorus to 1.5% potash. This ratio is contained in a commercial mixed fertilizer having a 4:10:6 formula which is stated on the container. The exact ratio and the amount to use for maximum result depends on the nature of the greenhouse soil. But the above 4:10:6 will be found excellent for most soils in the Tanana Valley.

Blossom end rot is a physiological disease that can be prevented but cannot be cured. As a preventive the plants should have adequate water at all times. Water thoroughly but not excessively. Allowing the surface to become dry is beneficial. Then apply enough water to wet the bed to its entire depth. This encourages the plant to develop deep roots and secure an even supply of water.

The virus disease observed in a few greenhouses appeared to be the kind known as streak. There are two types of streak, one caused by a single virus and the other by a mixture of viruses. The former is the more prevalent. The symptoms are: mottling and severe distortion of the leaves, a stunting of the plant, dead areas (necrotic lesions) on the leaf, stalk, petiole or fruit. There are no remedial measures once the disease is present. Removal of the plant is of doubtful value. However, the disease is spread from plant to plant by handling as in pruning. A thorough washing with soap and water will clean the hands or implements of the virus. It has been demonstrated that the virus carried in tobacco can infect tomato plants by the hands of the smoker.

Apparently the virus will not carry over in the soil from year to year. Nevertheless, it is a good precaution to start the tomato seedlings in sterilized soil. Any plants in the seed flats that appear unhealthy should be destroyed.

Farmer's Bulletin No. 1934, of the U. S. Department of Agriculture entitled "Tomato Diseases" will be found useful to anyone growing tomatoes.

A Happy Reunion

According to the Homer Homestead a happy reunion took place there recently. Mike, the Siberian sled dog belonging to John Lentz, returned home after three years and three days in the service of our country. He enlisted in San Francisco the second year of the war and was used in training other dogs to pack and to pull sleds. Mike stepped off the plane and rushed to his master to be petted and made over. He had flown all the way first class from Nebraska where he had received his discharge from the service. We are proud of this returned war veteran.

THE CHICKEN HOUSE

Prime Poultry Pays Profits

Treat Poultry Manure

The problem of handling poultry manure should be considered from two standpoints. The first is the use of a suitable material on the dropping boards to make cleaning easier. If the nitrogen content of the manure is to be conserved, superphosphate appears to be the best material to use. The rate of application should be not less than 100 pounds of superphosphate to the ton of manure and 200 pounds is better, according to results of a test conducted by Yushok and Bear of the New Jersey Agricultural Experimental Station as published in the Dairy Farmer's Digest.

If one is not interested in conserving the nitrogen content of the poultry manure, dry sand, sifted coal ashes, or sawdust can be used.

In some poultry plants, which may be near home or poultry plants on estates, the odor of poultry manure may be found objectionable. It was found that hydrated lime was an effective deodorizing agent and in addition had the effect of materially reducing the loss of nitrogen from poultry manure, although it was not as good as superphosphate for that purpose. The rate of application suggested is from 100 to 200 pounds of hydrated lime to a ton of manure. The 100-pound rate is adequate if the lime is thoroughly mixed with the manure. However, if the lime is merely scattered over the droppings the rate should be increased to 200 pounds of lime per ton of manure. It is suggested by the New Jersey investigators that 1½ pounds of hydrated lime per day is sufficient for treating the droppings under the roosts of 100 hens.

Further advantages of the use of lime were found in the fact that treated manure piles were unattractive to flies, as well as rats and mice.

For years poultrymen have been under the impression that hydrated lime liberated nitrogen, in the form of ammonia from poultry manure.

Sulfa In Water

Sulfaguanidine in drinking water has given good results in controlling coccidiosis on Frank Crandon's Massachusetts poultry farm, according to the Farm Journal.

Crandon raises broilers, and figures his dosage on the weight of the birds in his flock, and not on the number. He feeds 1 tablespoonful of sulfaguanidine to 100 pounds of poultry at the first sign of bloody droppings.

If the first day's dose doesn't stop the trouble, he repeats.

Soil-building is the firm foundation upon which agricultural prosperity is built.—Secretary of Commerce Henry A. Wallace.

Turkey Talk

Crooked and dented breastbones in turkeys are common and sometimes cause considerable loss to growers when the birds are marketed, since a severely crooked or very deeply dented breastbone causes the carcass to be graded as No. 2.

It is generally believed that faulty nutrition causes most of the deformed breastbones, although roosts narrower than 3 inches have been known to cause deformities of this kind. If turkeys are so fed as to keep growing at a normal rate, provided with roosts 3 to 4 inches wide, and have plenty of direct sunlight, there will be few if any crooked breastbones among them. Plenty of green feed and a constant supply of dry mash containing 20 to 22 per cent of a good-quality meat scrap or dried milk (or a mixture of the two), 1 per cent of salt, and 1 to 2 per cent of cod-liver oil (when direct sunshine is not available), in addition to ground grains, will help to prevent deformed breastbones. The addition of 2 to 3 per cent of steamed bone meal and 1 to 2 per cent of limestone grit or oyster shell as a mineral reinforcement is often recommended. Many growers keep a supply of crushed oyster shell before their birds at all times, but it is better to add 1 to 2 per cent of this ingredient to the mash.

He Ducks Waste

Farmer White of Sauk County, Wisconsin, has a ducky way of salvaging feed his turkeys waste. He keeps ducks.

White raises his turkeys on sun porches high off the ground on the slope of a hill. The area under the sun porches is fenced, and that's where he keeps his ducks.

They eat the grain that falls through the slats on the floors of the porches, and they get their water from the overflow from the turkeys' watering troughs.

Grass For Pullets

You can raise your pullets with less feed this year, if you're willing to let them develop a little slower than usual. So says the Experiment Station in New Jersey.

If you have plenty of good grass on range, you can safely leave mash out of the ration from the time the pullets are 12 weeks old until they go into the laying house.

Of course, the pullets won't grow as fast or start laying as soon as birds fed a complete ration, but their later ability to lay eggs won't be hurt.

When they were fed only grain, and had all the good grass they wanted to eat, it took the test pullets eight weeks longer to reach maturity than those who got plenty of mash. Once they started to lay, however, they produced more eggs than the mash-fed birds.

There was no difference in mortality between the two groups.

This would be a help to the farmer if it were possible for him to raise his pullets this way during the shortage of feed. May help to save his flock for laying purposes instead of marketing friers.

Only uncomfortable chairs become antiques; comfortable chairs are worn out by use in a single generation.

Face powder may catch a man, but it takes baking powder to keep him.

MILLER HOUSE

Mile 115 (from Fairbanks) on Steese Highway

Store and Pioneer Roadhouse

—50 Years Continuous Operation—

Mr. and Mrs. Frank Miller

PAXSON LODGE

One of Alaska's Pioneer Establishments
Located near Beautiful Paxson Lake
Just Halfway on Richardson Highway

Fishing Headquarters for Paxson, Summit and Phelan Lakes—Good Service for the Traveler and His Car

Russell M. Keith, Prop.

RAPIDS HUNTING LODGE

Located on Richardson Highway midway between Fairbanks and Junction of Glenn and Richardson Highways — 38 miles from the Alcan Highway

Near Beautiful Summit and Phelan Lakes
Good Hunting and Fishing

Mr. and Mrs. J. B. Coble, Props.

RICHARDSON ROAD HOUSE

73 Miles from Fairbanks

20 Miles from Big Delta

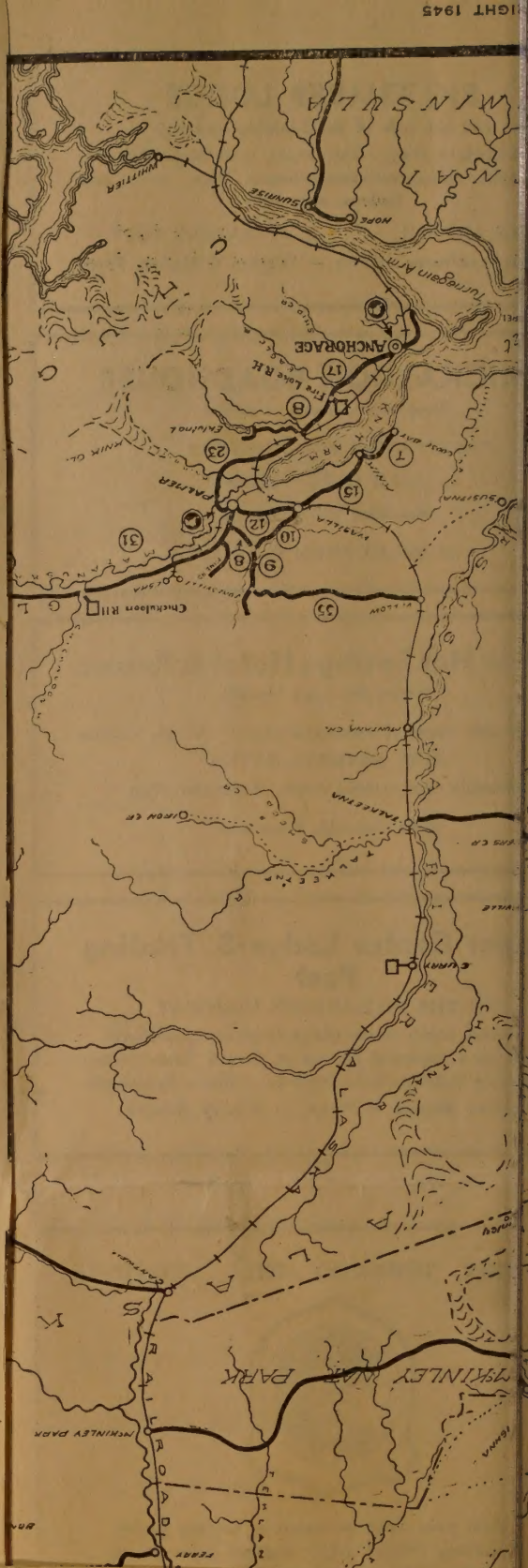
(ON THE RICHARDSON HIGHWAY)

Lunch and Refreshments

THE SPORTSMAN

408 Cushman St., Fairbanks, Alaska

GUNS AND FISHING TACKLE



Help Protect - - -

Your . . . HUNTING AND FISHING

SCENIC BEAUTY

TIMBER RESOURCES

ROAD M

(With Mileage Tab

Alaskan Highw

This road-map folder is publis promote protection of Alaskan F and wild-life — by preventing ne fires. It is sponsored by the Store Roadhouses listed within.

You can do your part by obs these few simple rules:

0 5 10 20 Scale in miles 50 60 65 70 75

LEGEND

- RANGER or FIREGUARD STA.
- (6) POINT to POINT MILEAGE.
- ROADHOUSES (DISTANCE OF SYMBOL FROM ROAD VARIES FOR MAPPING CONVENIENCE ONLY)
- HIGHWAYS & OTHER AUTO RDS.
- OLD WINTER SLED TRAILS.
- TOWNS - MINES - PERM. CAMPS.

YUKON RIVER
RAMPART
EUREKA
TANANA R.
TOLOVANA R.
LIVENGOOD
DAMY CR.
YELLOW HWY
CHATANIKA
CHATANIKA R.
COLLEGE ESTER
FAIRBANKS
PREACHER CR.
BEAVER CR.
STEESE HWY
TWELVE-MILE SUMMIT El. 3,225
EAGLE SUMMIT El. 3880
CIRCLE CITY
Central RH
Miller House
Medicine L.
Circle Hot Spr.
CIRCLE HOT SPR.
BIRCH CR.
CHENA HOT SPRINGS
CHENA
CHENA R.
TANANA RIVER
CHENA R.
HARLEY R.
ALDER CR.
SEVENTYMILE
EAGLE
CARIBOU CR.
SALCHA
WOOD R.
DRY CR.
L. Harding
Silver Fox RH
Birch L.
Richardson RH
Quartz L.
BONNIFIELD
EVA CR.
FERRY
BIG DELTA
Big Delta RH
LITTLE DELTA R.
DELTA R.
DELTA CR.
Mt. Deborah El. 12,339
Mt. Hayes El. 13,740
Mt. Hayes El. 12,030
BUFFALO
JARVIS CR.
HEARY R.
HUNT L.
MOOSEHORN CR.
MOOSEHORN L.
MOSQUITO FORK
FORTYMILE
MIDDLE FORK
FORTYMILE R.
JOSEPH CR.
CHICKEN
NEW CHUM STAKE
McKINLEY PARK
MT. McKINLEY NAT. PARK
CANTWELL
Mt. McKinley 20,300
ALASKA RAILROAD
CHULITNA R.
ODENALI
Rapids Hunting Lodge
BLACK RAPIDS GLACIER
GERSTLE R.
JOHNSON R.
GERSTLE RIVER
BERRY CR.
CEDRIC CR.
PINGUICULA CR.
ALASKA RANGE
ISABELLA PASS El. 3,370
Fishing
Summit L.
Mt. Kimball El. 9690
ROBERTSON R.
L. Mumchen
TANACROSS
TOK JCT.
WOODCHUCK CR.
ALASKA HIGHWAY
TOK R.
Midway L.
TETLIN
L. Tetlin
NORTHWAY JCT.
Paxson RH
Paxson L.
McLAREN R.
SUSITNA R.
GAKONA R.
CHISTOCHINA R.
Nora L.
Tetlin Jct.
Scottie L.
TOK CR.
TETLIN R.
NORTHWAY
SLANA
Sourdough RH
Gakona RH
SLANA-TOK HWY
Christochina RH
NABESNA RD.
NABESNA
L. Tonsina
SUSITNA
WEST FORK
L. Tyone
L. Susitna
L. Louise
Crosswind L.
L. Ewan
Big Timber Lodge
Santa Claus Lodge
GULKANA
SANFORD R.
Mt. Sanford El. 16,208
Mt. Drum El. 12,002
Mt. Wrangell El. 14,005
WRANGELL MTS.
Ohman L.
LITTLE NELCHINA R.
Eureka RH
Happy's Camp
COPPER CENTER
Copper Center RH
Tazlina L.
TAZLINA
Klutina L.
KLUTINA R.
COPPER R.
TOLSONA R.
CHITINA
RICHARDSON HWY
Mt. Marcus El. 13,250
Mt. Witherspoon El. 12,023
Chickaloon RH
Sheep Mtn. Inn
GLENN HWY
MATANUSKA GL.
TALKEETNA MTS.
Susitna
WASILLA
PALMER
Fire Lake RH
ANCHORAGE
Knik Arm
Turnagain Arm
EKLUTNA L.
EAGLE R.
CHUGACH MTS.
COLUMBIA GLACIER
VALDEZ
Mt. Thompson Pass El. 6782
ANVIL R.
KENAI PENINSULA
HOPE
SUNRISE
WHITTIER
Prince William Sound
TALKEETNA
TALKEETNA R.
SUSITNA R.
PETERS CR.
CHULITNA
MUNTANA CR.
OSHETNA R.
TYONE CR.
SCHEIDEGGER CR.
CHERRYVILLE
EVANS
Mt. McKinley 20,300

ROAD MAP AREA

ARCTIC OCEAN
BERING STRAITS
KOTZEBUE
NOME
NORTON SOUND
YUKON RIVER
KOYUKUK R.
KOBUK R.
McGRATH
Mt. McKINLEY
BETHEL
KUSKOKWIM R.
FT. YUKON
CIRCLE
LIVENGOOD
FAIRBANKS
BIG DELTA
GULKANA
NABESNA
CHITINA
ANCHORAGE
VALDEZ
SEWARD
KODIAK
GULF OF ALASKA
PACIFIC OCEAN
ALASKA - (U.S.A.) - - YUKON - (CANADA) BOUNDARY

0 25 50 100 150 200 250

Wm. A. Wallace AFCS Jan 1945

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BIG TIMBER LODGE

(At the hub of the highway system)

On Richardson Hwy.—Opp. Junct. with Slana-Tok Rd.
Overnight Accommodations—meals, beer, wine and liquors, souvenirs

GAS AND OIL TRADING POST

Prompt, courteous service — Warren O'Malley, Prop.

CHICKALOON ROADHOUSE

Beer, wine, meals — cabins

PACK TRAINS FOR HUNTERS

JACK COREY, Guide

Standard Oil Products

(31 MILES FROM PALMER)

Circle Hot Springs Hotel & Resort

(Open the year 'round)

Comfortable Hotel Accommodations — Private Cabins

HOT MINERAL BATHS

Monthly and weekly rates, American Plan

John Berdahl, Proprietor

Copper Center Lodge & Trading Post

ON THE RICHARDSON HIGHWAY

(14 miles south of the Glenn Highway Junction)
Located in a beautiful section of Copper River Valley
First-Class Hotel Accommodations — Rates Reasonable

Florence Barnes — Props. — Wesley Kennedy

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At the Summit of the Glenn Highway
on Eureka Lake
129 MILES FROM ANCHORAGE
Cabins, Excellent Home Cooking — Gas and Oil

Mr. and Mrs. Paul Wavrick, Props.

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On the Palmer Highway, 18 miles from Anchorage

Steaks, Chicken, "Bar-B-Qued" Ribs, Spaghetti
Cold Beer Choice Wines

COMPLETELY FURNISHED CABINS, WITH INSIDE TOILETS

Your Hostess: Vesta Your Chef: Pete

Gakona Roadhouse and Trading Post

Gateway to the Alcan Highway (via Slana-Tok Road)

Hotel Rooms * Store * Meals family style

Arne Sundt, Prop.

HAPPY'S CAMP

CABINS, MEALS, BEER, WINE

STANDARD OIL PRODUCTS

4 MILES WEST OF GLENALLEN

(136 MILES FROM PALMER)

MILLER HOUSE

Mile 115 (from Fairbanks) on Steese Highway

Store and Pioneer Roadhouse

—50 Years Continuous Operation—

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73 Miles from Fairbanks

20 Miles from Big Delta

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Lunch and Refreshments

FAIRBANKS—Sporting Goods Stores, Outfitters

Main's Department Store

Fairbanks, Alaska

FISHING TACKLE, SPORTING GOODS

Northern Commercial Company

Fairbanks, Alaska

Fishing Tackle and Guns, Sporting Goods

PATTON HARDWARE CO.

Fairbanks, Alaska

Fishing Tackle, Guns, Sporting Goods

THE SPORTSMAN

408 Cushman St., Fairbanks, Alaska

GUNS AND FISHING TACKLE

Help Protect---

Your . . . HUNTING AND FISHING
SCENIC BEAUTY
TIMBER RESOURCES
WATERSHEDS

BE CAREFUL WITH FIRE IN THE WOODS IT PAYS!

* * *

Please Report All Fires

The Alaskan Fire Control Service maintains Fire Guard Stations throughout Alaska. Refer to your Road Map for station nearest to scene of fire, then report it as quickly as possible - - - - -

EVERY MINUTE COUNTS

ROAD MAP

(With Mileage Tables)

Alaskan Highways

This road-map folder is published to promote protection of Alaskan forests and wild-life — by preventing needless fires. It is sponsored by the Stores and Roadhouses listed within.

You can do your part by observing these few simple rules:

1. Be sure your cigarette stub is out before throwing it away. The same goes for cigars and pipe tobacco —never throw them into grass, brush or leaves. Use your ashtray when driving.
2. Break your match in two before you throw it away. This makes sure that the match is out.
3. Before building campfire, scrape away all inflammable materials from a spot five feet in diameter. Dig a hole in the center and in it build your fire. Keep it small.
4. Put out campfire—DEAD OUT—before you leave. Stir the coals while soaking them with water. Turn small sticks and drench both sides. Wet the ground around the fire. Be sure the last spark is dead.
5. Never burn brush in windy weather. Be sure you can control it. Take absolutely no chances. Consult your nearest A. F. C. S. Ranger or Fire Guard. Put out any small fires you can.
6. Report fires at once. Time is most important. Use telephone if possible. Your nearest Ranger or Fire Guard Station is shown on your road map.

ALASKAN FIRE CONTROL SERVICE

WATERSHEDS

BE CAREFUL WITH FIRE IN THE WOODS IT PAYS!

* * *

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ichardson Hwy.—Opp. Junct. with Slana-Tok Rd.
night Accommodations—meals, beer, wine and
liquors, souvenirs
AS AND OIL TRADING POST
pt, courteous service — Warren O'Malley, Prop.

HICKALOON ROADHOUSE
Beer, wine, meals — cabins
PACK TRAINS FOR HUNTERS
JACK COREY, Guide
Standard Oil Products
(31 MILES FROM PALMER)

FIRE LAKE ROADHOUSE
On the Palmer Highway, 18 miles from Anchorage
Steaks, Chicken, "Bar-B-Qued" Ribs, Spaghetti
Cold Beer Choice Wines
COMPLETELY FURNISHED CABINS, WITH
INSIDE TOILETS
Your Hostess: Vesta Your Chef: Pete

EUREKA ROADHOUSE
At the Summit of the Glenn Highway
on Eureka Lake
129 MILES FROM ANCHORAGE
Cabins, Excellent Home Cooking — Gas and Oil
Mr. and Mrs. Paul Wavrick, Props.

Gakona Roadhouse and Trading Post
Gateway to the Alcan Highway (via Slana-Tok Road)
Hotel Rooms * Store * Meals family style
Arne Sundt, Prop.

HAPPY'S CAMP
CABINS, MEALS, BEER, WINE
STANDARD OIL PRODUCTS
4 MILES WEST OF GLENNALLEN
(136 MILES FROM PALMER)

cle Hot Springs Hotel & Resort
(Open the year 'round)
ortable Hotel Accommodations — Private Cabins
HOT MINERAL BATHS
Monthly and weekly rates, American Plan
John Berdahl, Proprietor

pper Center Lodge & Trading Post
ON THE RICHARDSON HIGHWAY
(14 miles south of the Glenn Highway Junction)
ated in a beautiful section of Copper River Valley
t-Class Hotel Accommodations — Rates Reasonable
Florence Barnes — Props. — Wesley Kennedy

July 10: Northeast of Fairbanks on the Loop road

Today Aamodt and Orr start a boat trip down the Tanana and up the Yukon to Circle. Edgar, Nygard, Magruder, and I go out to look at some land and farms northeast of Fairbanks.

We stop first to look at the soil on a low terrace, with about 1% slope, in the SE 1/4 of the NE 1/4 of section 26, 3 miles northeast of Fairbanks.

The principal vegetation is second growth white spruce, aspen, white birch, willow (in lower places), Labrador tea, dwarf dogwood, and so on, with both hypnum and sphagnum mosses.

A_0	2-0	Dark brown fibrous mat.
A_1	0-2"	Very dark brown, nearly black, very fine sandy loam, high in humus and with a great concentration of roots.
G_1	2-7"	Dark gray, mottled with "rusty" brown, compact, wet, very fine sandy loam.
G_2	7-13"	Brown, compact, wet, very fine sandy loam.
C	13-27"	Brownish-gray, compact, wet, light very fine sandy loam

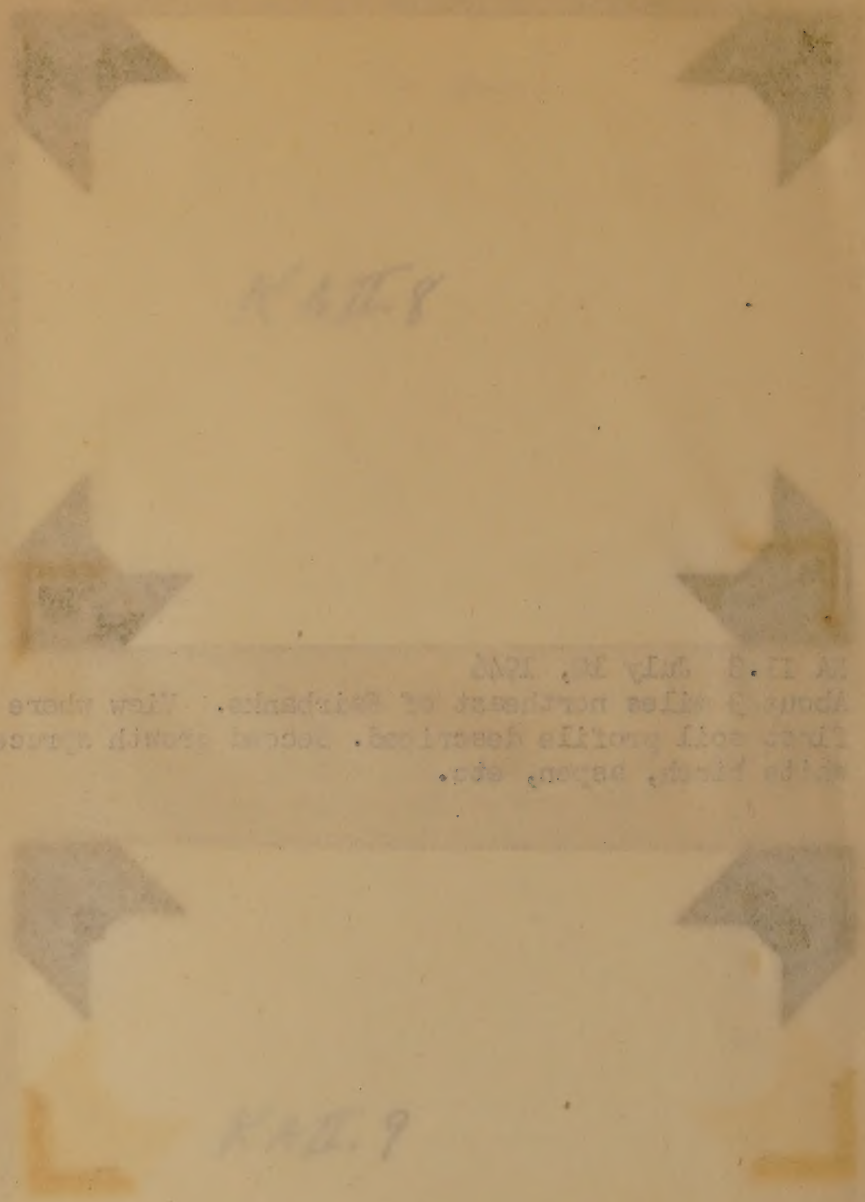
Permafrost at 27".

(Later: I found this to be a common profile - Tanana soil?)

These soils give the impression of being swampy, but dry out a great deal after clearing.

KA II.8 July 10, 1946
About 3 miles northeast of Fairbanks. View where first soil profile described. Second growth spruce, white birch, aspen, etc.

KA II.9 July 10, 1946
About 3 miles northeast of Fairbanks. View where first soil profile described. Second growth spruce, white birch, aspen. etc. (Another view)



KA II.10 July 10, 1946
About 3 miles northeast of Fairbanks. View where first soil profile described. Second growth spruce, white birch, aspen, etc. (Another view)

We drive on along the "Loop" road and off a ways on a side road to the farm of Charles McGrath (Box 671, Fairbanks). He is a comparatively young man who has taken over this potato farm from his partially retired father. He lost one arm in an accident with a "cat" (tractor). Yet he is full of energy and bubbling with ideas about farming, the University, and much else. Some are good; others are not. He "embellishes" his speech a great deal in the hardy pioneer style.

We walk out over a potato field that he is now cultivating (KA II. 12). The soil should likely be called Fairbanks very fine sandy loam, with about 5 to 6% slope. The potato rows are widely spaced for convenience in the use of machinery and to be sure of tubers of good size. He recognizes a significant erosion hazard and suggests large ditches at a slight angle to the contour. Although there are a few summer storms, most washing comes with the spring thaws. Then the ditches must be watched very carefully to keep them clear of ice. He suggests such a diversion ditch every 20' vertically (enough?) He thinks terracing should not be done, in the standard way at least, on new ground, although it may be good on old ground. He favors this ditch-terrace but not strip-cropping, although the reasons are not made clear (to me). I note that some terraced land has been abandoned, however. Terracing may use up the surface soil rich in organic matter, which is apparently necessary for good crops.

In some seasons potatoes grow well on the low land (like the soil last described), but often they freeze and McGrath thinks their quality is inferior anyway.

He strongly favors blue top 1/ (Calamogrostis) grass for a time to restore soil. He has 11 crops of potatoes and then back to grass for 4 years.

After knocking out small second-growth trees, he advocates widely spaced discing in July with 24" bush breaker. Then he discs again in late summer. The following spring he plows, discs, perhaps uses a rotatiller, and then harrows before planting. Often he plows up-and-down the slope and later cross plows.

He uses fertilizer at the rate of 700 lbs. per acre, made up of 2 sacks of 18% superphosphate to 1 sack of muriate of potash. Where brush has been burned a good deal he cuts the rate to 500 lbs. He uses little nitrogen because he has found that it reduces the quality of his potatoes.

McGrath would very much like to try an overhead irrigation system. (Water supply?)

Land that he "broke out" (from brush, not forest) in late August had a good stand of volunteer blue top the following spring. When he plowed in July he got lots of young volunteer aspen. Also there is much brush, mostly aspen,

---

1/ Often called "red top" by local farmers; a few call it "purple top."

KA II.12 July 10, 1946
Charles. McGrath farm, northeast of Fairbanks.
Potatoes on Fairbanks very fine sandy loam
(near site of sample No. 7)

KAII.12

from June plowing.

In the bottoms of the natural gullies, the soil has much more organic matter and is more productive of potatoes. McGrath is much opposed to unnecessary burning.

In a place near the potatoes that had been cleared and fired a long time ago, plowed in 1942, and now had a good stand of blue top, samples 1/ of soil and grass were taken. (Sample No. 7 - Fairbanks very fine sandy loam - 6% slope) 2/

A_{p-1}	0-9"	Mineral portion of plowed layer. Weak brown light very sandy loam, friable and soft crumb.
A_{p-2}		In this plowed layer were lenses of organic material, plowed in, which is collected and labeled separately.
B	9-20"	Light grayish-brown micaceous light very fine sandy loam. Rather compact in place, but very friable when removed.

McGrath shows us some volunteer wheat and rye that had lived over from a seeding made the spring of 1945. The new growing stems have come up through the old crowns.

He warns to avoid alder in clearing as it indicates shallow permafrost (only very roughly I suspect).

1/ McGrath is eager to know the results.

2/ These numbers were used for all Alaska samples. Only those collected by me, or by Iver and me together, are included in these notes.

We have lunch with Mr. and Mrs. McGrath, and an old Swede sourdough working for him. Much talk about the inadequacy of the Experiment Station. The lunch is excellent. Afterward we walk up on another slope and look at the soil and grass, and into a small gold mine his father once worked.

We next continue on the "Loop" road and visit, briefly, the farm of Mr. Paul Elbert. He is not at home but his wife shows us about. The soil is Fairbanks very fine sandy loam. The cropped portion has a slope of about 3%. Back of the fields are rather steep slopes covered by woods and grass.

Beans, lettuce (leaf and head), chard, rutabagas, cucumbers, and strawberries are grown. Chickens are also grown for sale as broilers in a closely packed very smelly chicken house. Chicks and all feed are purchased.

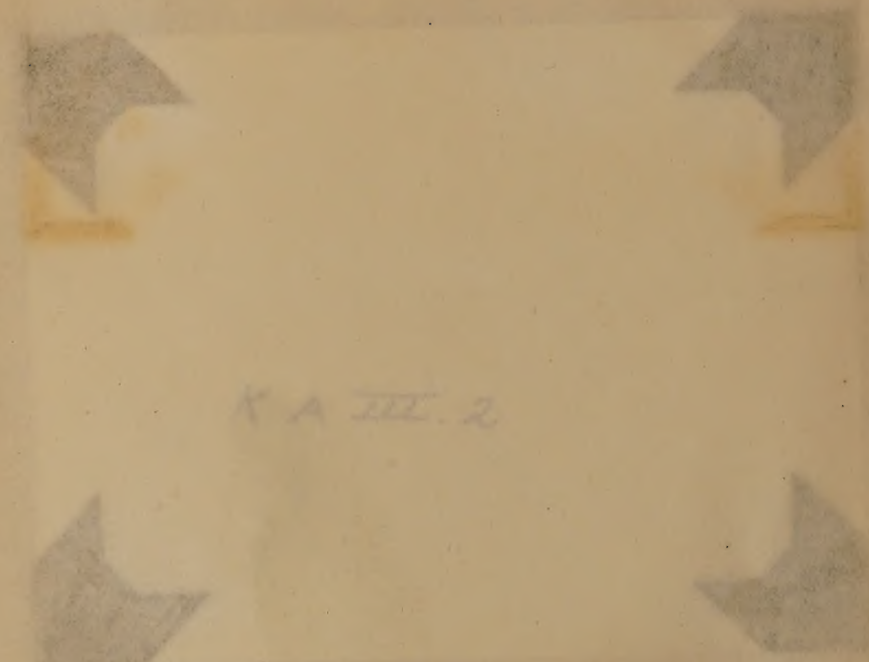
Cucumbers, and a little squash and corn, are grown out doors in old oil drums filled with a mixture of old rotted manure and soil. These are irrigated with liquid fertilizer made by soaking commercial fertilizer (probably fish meal) in water.

KA III.1 July 10, 1946
Paul Elbert farm, northeast of Fairbanks.
Cucumbers in oil drums.

KA III.2 July 10, 1946
Paul Elbert farm, northeast of Fairbanks. Vegetables on Fairbanks very fine sandy loam. Beans in foreground, cabbage, and new seeding of rutabagas.

K A ZZZ. 1

K A ZZZ. 2



KA III.3 July 10, 1946
Paul Elbert farm, northeast of Fairbanks.
Vegetables on Fairbanks very fine sandy loam.
Beans in foreground, cabbage, and new seeding
of rutabagas.

KA III 3

Mrs. Elbert gives us some Fairbanks prices:

Sells: Chickens, per lb. live $1.00
" " " dressed.....$1.25

Strawberries, per lb. (about 1 pt.)$1.00

Cucumbers, each $1.00

Lettuce, head, crate $10.00
" leaf, lb. ..... .20

Celery, 2-lb. bunch $1.00-1.25

Farm hands are hired at $200.00 per month plus room and board.

Now we discover that McGrath left his artificial arm in our "car" and we must return over this rough road with it! Edgar and Magruder drive up to his place while I look at the soil along the road that has been cleared with a bulldozer. The soil is like that first described today. By rolling up the roots and moss on the surface into windrows for burning, a large percentage of the surface organic matter and soil are lost. And once lost it would be very difficult to replace. It is easy to set the bulldozer blade deep enough to get all the roots. But one cannot clear this land without some hand work pulling roots if the organic matter is to be saved. It would seem much better to clear in the winter when the ground is frozen or use scarifier teeth instead of a blade. As these farms become older the maintenance of soil organic matter will certainly become a great problem.

KA III.4 July 10, 1946
Along Loop road northeast of Fairbanks. Cleared surface along road on soil first described July 10. Note shallow A_0 and A_1 horizons rolled back. When crop land is so cleared the organic matter is lost.

KA III.5 July 10, 1946
Along Loop road northeast of Fairbanks. Close up of spruce tipped over. Note very shallow roots.

KA III. 4

KA III. 5

Item: We have head lettuce with our dinner at the Model - the result of Magruder's "thieving" at the Elbert place.

This evening, in bright sunlight, on the way back from the restaurant to our hotel, I pass an excavation, adjacent to a garage, about 12 feet deep in the old river terrace. There is much cross-bedding of very fine sand and organic layers. Several old trees were deeply buried. The upper boundary of the permafrost is exposed and is exceedingly irregular. In places are lenses of almost pure blue ice.

This is all explained by the proprietor. He says that this area had, for a long time, a tropical climate; then, suddenly, a great storm began. It became so cold that the ground froze; plants and animals perished; and glaciers appeared in the mountains. Now, he continues, when this earth is thrown out in gold mining the seeds of the tropical plants germinate and grow. But, of course, the plants are killed with autumn frosts. I shall need to look for some young palm trees!

July 11: Fairbanks to Livengood and return

Up early for a trip to Livengood, about 80 miles north of Fairbanks, in the rough-riding command "car" with Iver and Edgar. We first stop to look at a gully in section 20 caused by the melting of ice lenses in the permafrost. Although it looks, superficially, like an ordinary gully, there is no deposition at the lower end at all. We take several photographs. The field has been cleared for some time and slopes to the south - hence the greatly increased melting. As more land is cleared these gullies may become quite hazardous.

We pass by the little road-crossing of Fox, beyond a stream valley being torn to pieces by hydraulic gold mining. It makes one's blood boil to see the way in which these gold-mining companies are permitted to leave the land - simply a horrible mass of piles of cobbles and boulders. As a very minimum, they should be required to level the dumps. And, of course, they pay no land tax at all! In fact, no one does in Alaska outside of incorporated towns - a great boom to non-resident (and resident) land hogging and speculation, in farm land as well as in mineral land.

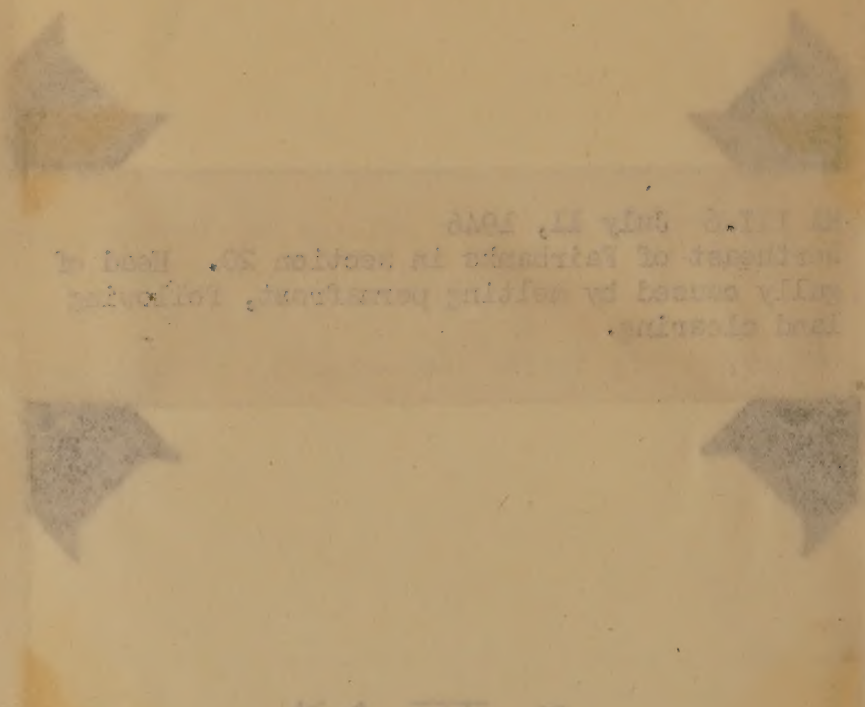
We go north from Fox into the uplands, above the hills with the thick covering of wind-blown material [1] from which

[1] I prefer to side-step the question of whether or not this is loess. I feel certain that this very fine sand is wind-deposited; but I'm no longer certain what loess is!

KA III.6 July 11, 1946
Northeast of Fairbanks in section 20. Head of gully caused by melting permafrost, following land clearing.

KA III.7 July 11, 1946
Northeast of Fairbanks. Gully caused by melting ice blocks in permafrost following land clearing. No deposition at foot of gully.

KAIII.6



KA III.7

KA III.8 July 11, 1946
Northeast of Fairbanks, near Fox. Hydraulic gold mining.

KA III-8

the Fairbanks very fine sandy loam is developed.

On a rather high, gently sloping, well drained upland (4-7% slope) we sample the soil - probably Gilmore very fine sandy loam.[1/] The cover consists of small spruce, with some white birch, alder, and so on. The ground cover consists of Labrador tea, blueberries, crowberry, low-bush cranberry, dwarf dogwood, mosses, and lichens (reindeer moss).

Sample No. 8

A_0	2½-0	Weak brown fluffy, fibrous mat, with many live roots.
A_1	0-2"	Weak to moderate brown, highly micaceous, very fine sandy loam. Soft, irregular, granular structure. Some charcoal. Some schist fragments. Many live roots.
B_1	2-10"	Dark to moderate yellowish-brown, highly micaceous very fine sandy loam. Slightly compact in place, but easily friable when removed. Slightly mottled. A few roots. Somewhat vesicular. Some schist fragments.
C	10-18"	Like the above but slightly paler and becoming very stony at 18". Very cold yet not frozen.
D	18 -	Weathered schist fragments.

About 19 miles from Fairbanks, near the old village of Olness, we visit an old sourdough - Lorenzo Magnachi - who built his cabin in 1905 near a gold mine, long since abandoned, where he once worked. He lives alone with his dog. His cabin

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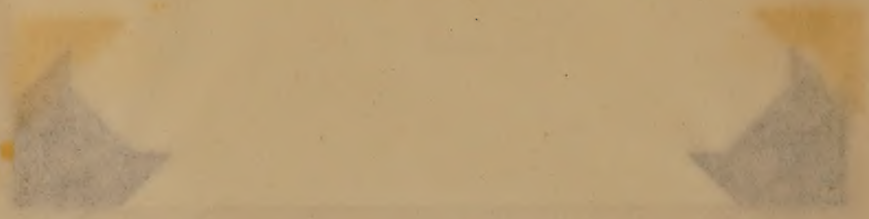
1/ According to the old reconnaissance survey.

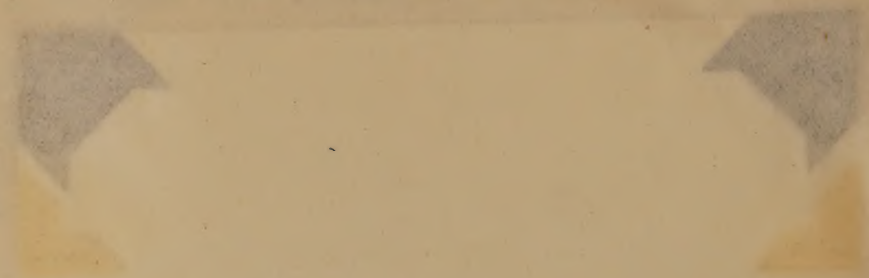
KA III.9 July 11, 1946
North of Fox. View on Gilmore very fine sandy loam at site of sample No. 8.

KA III.10 July 11, 1946
North of Fox. View on Gilmore very fine sandy loam at site of sample No. 8.

KA III-9



KA III.9 July 11, 1946
North of Fox. View on Gilmore very fine sandy
loam at site of sample No. 9.



KA III-10

KA III.10 July 11, 1946
North of Fox. View on Gilmore very fine sandy
loam at site of sample No. 10.

KA III. 11 July 11, 1946
North of Fox. View on Gilmore very fine sandy loam at site of sample No. 8.

Fig. 1. Profile of Fox. View on Gilmore Very Fine Sandy Loam at site of sample No. 8.

KA III.12 July 11, 1946
North of Fox. View on Gilmore very fine sandy loam at site of sample No. 8.

KA III.12

KA IV.1 July 11, 1946
About 19 miles north of Fairbanks, near Olness. Home of Lorenzo Magnachi, built in 1905. He has small fruits and many tiny vegetable plots.

KA IV.2 July 11, 1946
Near Chatinika River on Livengood-Fairbanks road. Large area of sphagnum peat with dwarf black spruce, ledu, vaccinium, etc.

is small, but neat; and he has a good root cellar. In several tiny garden plots, on a colluvial associate of the Gilmore, he has potatoes, strawberries, beets, carrots, cabbages, rhubarb, raspberries, peas, lettuce, rutabagas, and chard. He cuts a little patch of hay, which he cures and uses to cover his strawberries in winter. He makes compost from green leaves, herbs, and grass for the soil. He says that he stores carrots, potatoes, and rutabagas for use the whole year. He is now old and mellow, and too full of memories to get lonesome. He is friendly, but certainly not overwhelmed that he has visitors; he has reached that stage of philosophical nirvana where "company" is neither needed nor sent away. Besides his dog, he has several bird houses to attract the sort of folks he wants.

Near the Chatinika River we examine a great area of beautiful sphagnum peat. There is a thin stand of stunted black spruce, with ledum, vaccinium (sp.), a dwarf rubus, and much moss.

1. - Thin surface of growing sphagnum moss.
2. 0-12" Golden sphagnum peat.
3. 12-24" Slightly browner moss peat.

Permafrost at 24".

We pass on into hilly country where the tops of the hills are just about at the timber line. These look like grass-covered hills from a plane, but actually there is very little

KA IV.3 July 11, 1946
North of Chatinika River on road to Livengood. High land just above timber line. Shallow peat with ever-frozen substratum.

.KA IV.4 July 11, 1946
North of Chatinika River on road to Livengood. High land just above timber line. Shallow peat with ever-frozen substratum. (Another view)

KA IV. 3

KA IV. 4

grass - mostly small shrubs, mosses, lichens, and a little sedge. Even on rather considerable slopes the peat (or A_0) may be $1\frac{1}{2}$ to 3 feet deep over a glei, with permafrost just a little lower.

We come upon some hills of quartz-diorite. Here the soil is thin - 12 to 18 inches over the rock - brown, almost fluffy, and with an excellent granular structure. It looks like Brown Forest, but is just <u>above</u> the timber line. The cover is again vaccinium (sp.), low-bush cranberry, dwarf willow, moss, and lichens. There are beautiful delphinium and other wild flowers. (Mentioning wild flowers reminds me of the glorious fireweed that grows all over where the land has been disturbed. If it weren't so <u>very</u> common, people would certainly have it in their gardens.)

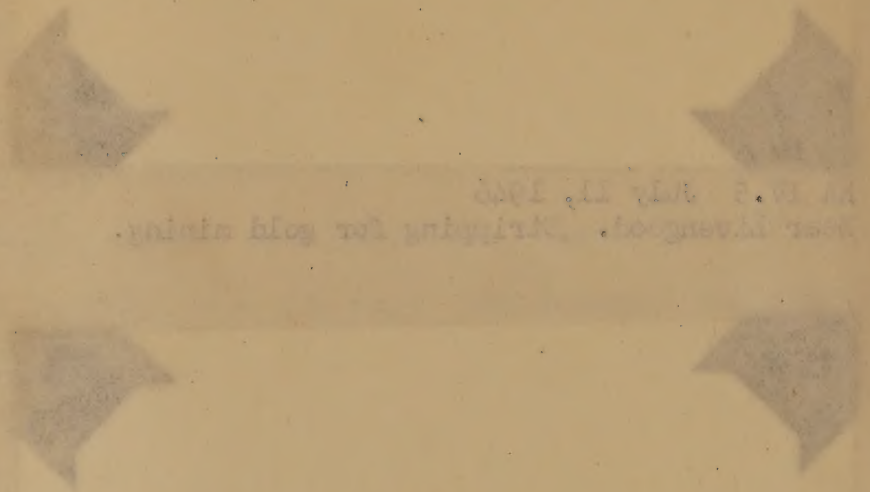
As we come within 23 miles or so of Livengood we find a shallow but clearly developed Podzol from weathered slate. The site is well-drained on a 1 to 3% slope. The forest is dominated by beautiful white birch, along with white spruce, alder, low-bush cranberry, vaccinium (sp.), etc.

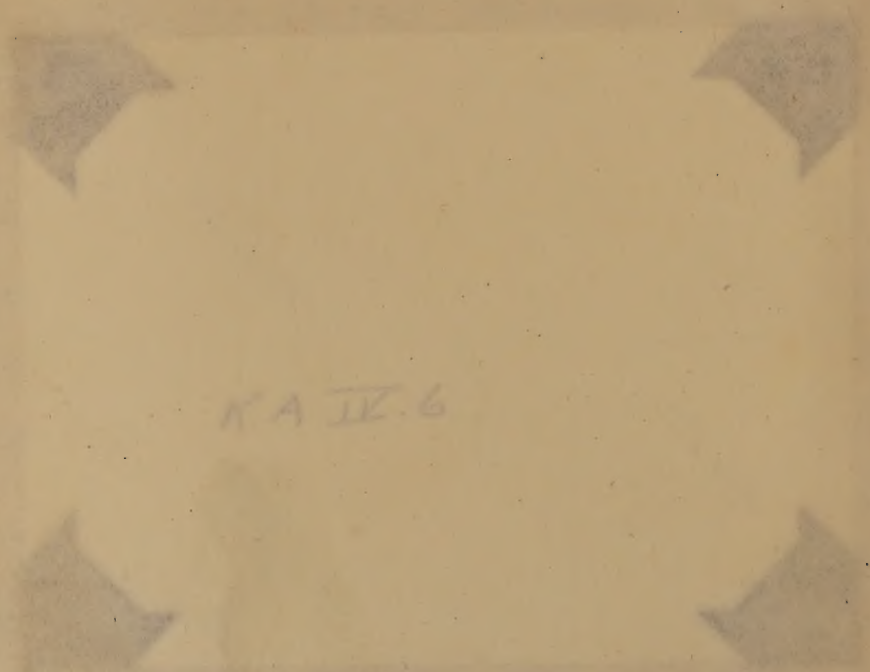
A_0	2-0	Brown organic mat.
A_1	0-1"	Brownish-gray light very fine sandy loam.
A_2	1-4"	Gray, platy light very fine sandy loam.
B	4-12"	Light yellowish-brown very fine sandy loam.
C	12 -	Weathered slate-like rock.

KA IV.5 July 11, 1946
Near Livengood. Stripping for gold mining.

KA IV.6 July 12, 1946
Near Livengood. Landscape.

KAIK.5





KAIK.6

Although 'twas warm in Fairbanks, it is cold here. We pass by a place where there has been hail a little while ago. The hail stones are now in little banks along the road. It rains. About 2 miles south of Livengood we see a brown, silty, thin, lithosolic Brown Forest soil from hilly trap rock. There is a faint suggestion of Podzol A_2 and B_2. The cover is thin white birch and spruce with the usual ground cover - vaccinium (sp.), a little grass, and so on.

We stop near Livengood and take pictures, in heavy rain, of men removing the overburden, preparing for hydraulic gold mining.

After we turn back it suddenly becomes warmer but continues to rain. (How rough this "car" is!)

About 17 miles south of Livengood we glance hurriedly at a nice Brown Forest soil with an excellent stand of big white birch.

A_0	2-0	Brown raw mat, with birch and alder leaves.
A_1	0-2"	Very dark brown granular mull.
B	2-12"	Dark brownish-gray, friable very fine sandy loam.
C	12 - +	Loose trap rock fragments.

It is getting late and we hurry along. I hang on as best I can. But I do want to describe one more Podzol soil and to find one on schist, which is not too easy to do.

This one has a second growth of white birch, a few small spruce, and aspen, following fire. There are blueberries, other vaccinium (sp.), ledum, etc. Drainage is good on a 4-6% slope.

A_0	2-0	Brown porous trockentorf with many coarse roots.
A_1	0-½"	Indistinct; dark brown humus soil.
A_2	½-2"	Dark gray light very fine sandy loam. Slightly platy, friable, and many roots. Tongues go down 4 inches more.
B_2	2-5"	Moderate brown to yellowish-brown, bright, light very fine sandy loam. Digs out in easily friable chunks.
B_3	5-12"	Light yellowish-grown light very fine sandy loam. Easily friable.
B_{31}	12-16"	Light brown light very fine sandy loam. Somewhat platy. Slightly compact but easily friable.
C	16 - +	Dull yellowish-brown rotten schist.

We return to our hotel about 8:15. Mr. Edgar was very helpful today in our soil studies. After 162 miles in this command "car" over rough road my back is again crying. I decide definitely to ask the Mayo Clinic for an appointment. I straighten the back out on the floor and go to bed at once since I've just learned that the Navy will take me to Point Barrow tomorrow. I hope it will be a nice day. Magruder wants to go also.

2456
3045
Grouse Creek
Hess Creek
WINTER TRAIL
1955
Dam
Mine
DITCH
Cabins
Livengood
Amy Creek
2570
4808
CACHE
Cabin
Cabins
2277
Cabin
3220
DITCH
DITCHES
Tolovana River
Tatalina River
Washington Creek
Chatanika
Chatanika River
TS
Olnes
Village
Dome
Village
Cleary
Gilmore
Placer Mines
Bartlett
Martin
Cabin
Happy
Village
Minto Lakes
Minto
Cache Creek
TS
Ester
College
TS
AIRSTRIP
AIRSTRIP
FAIRBANKS
Cache
Muskeg
Cabin
Standard
Cache
Dunbar
Cabins
Cabin
TANANA RIVER
Berg
TS

5200
5200
2373
YUKON RIVER
Roadhouse
Rampart
AIRSTRIP
Cabins
Cabins
Cabins
4808
4600
TS
WOLVERINE
MT
Cabin
BALDRY MT
TS
Eureka
3050
TS
ROUGHTOP
MTN
AIRSTRIP
Glen Creek
2021
Huttlitakwa
Cabins
Placer
Mine
Fish Lake
Tofty
AIRSTRIP
AIRSTRIP
Cabin
Cabin
Creek
2650
Baker Lake
Huttlitakwa Creek
Patterson
AIRSTRIP
Manley Hot Springs
Baker
2150
Tolovana River
TANANA R
Cosna
2020
TS
Tolovana
Zitziana River
TS

July 12: Fairbanks to Point Barrow and return by Umiat

Up very early, to breakfast at the Model, and out to Ladd Field at 7:00 a.m. Yesterday, and again this morning, the naval officers suggest I plan to remain over one day at Point Barrow; but I have so very much to do that I decline. Before leaving, Magruder and I each sign a statement agreeing not to discuss any significant engineering developments we may see on this trip.

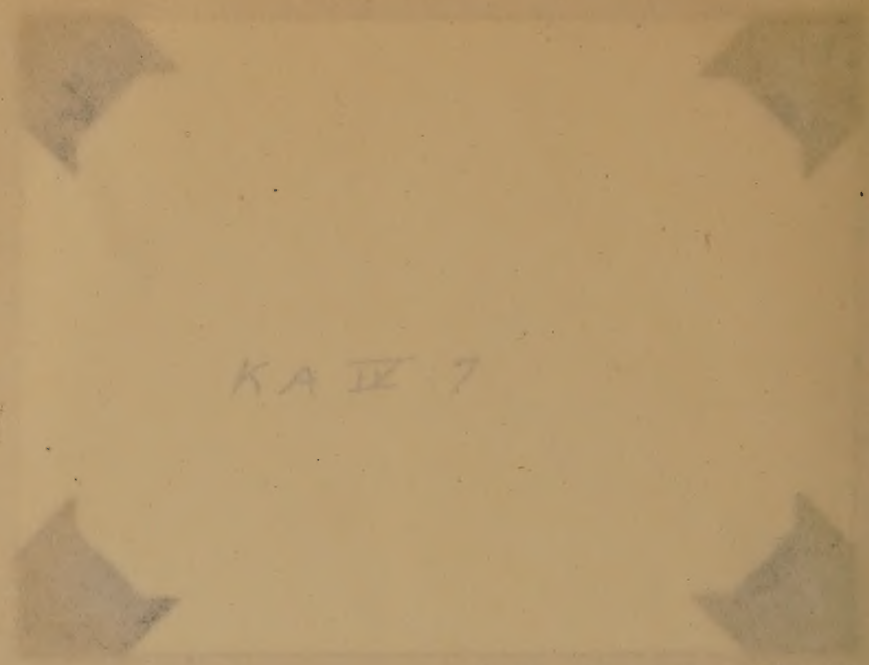
We leave Ladd Field and are in the air at 8:17 a.m. We are in a Navy transport plane (C 47) - a 2-motored cargo plane that has seen a lot of service. There are a few passengers besides us, including E. Y. Swapp and another geophysicist from the United Geophysical Company.

We fly northeast, a little west of Livengood and toward Beetles on the Koyukuk. As we go over the first upland, there appears from the plane to be more trees than I saw yesterday from the "car." Significantly more timber grows on the south slopes than on the north-facing ones.

We are over the Yukon River in 34 minutes. The upland beyond has a simple cover - a treeless Tundra landscape - with a few rock outcrops and a few clumps of conifers and deciduous trees in small, sheltered coves. Between Fish Creek and Beetles we pass over a large active burn. There is a haze of smoke over Beetles.

KA IV.7 July 12, 1946
Near Fish Creek

KA IV.8 July 12, 1946
Between Fish Creek and Bettles


KA IX 7

KA IX 8

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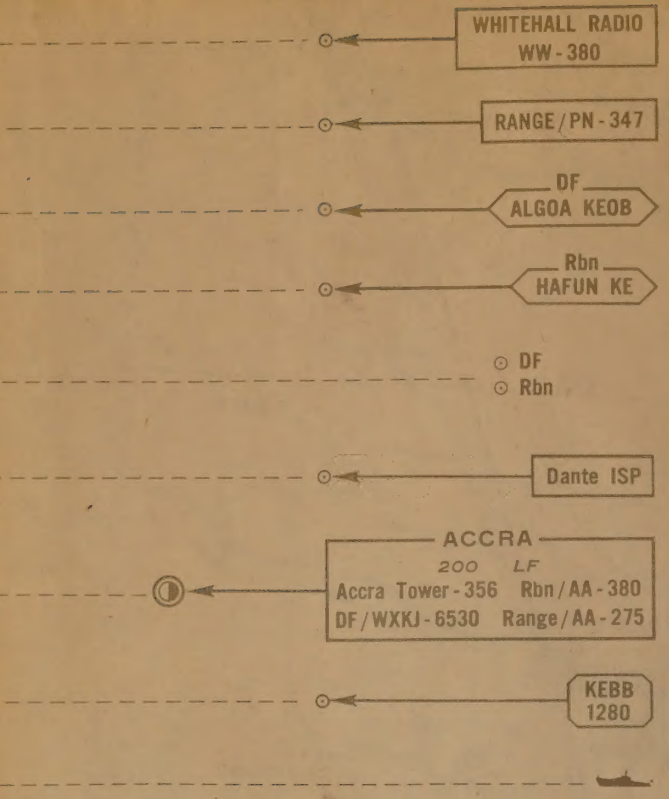

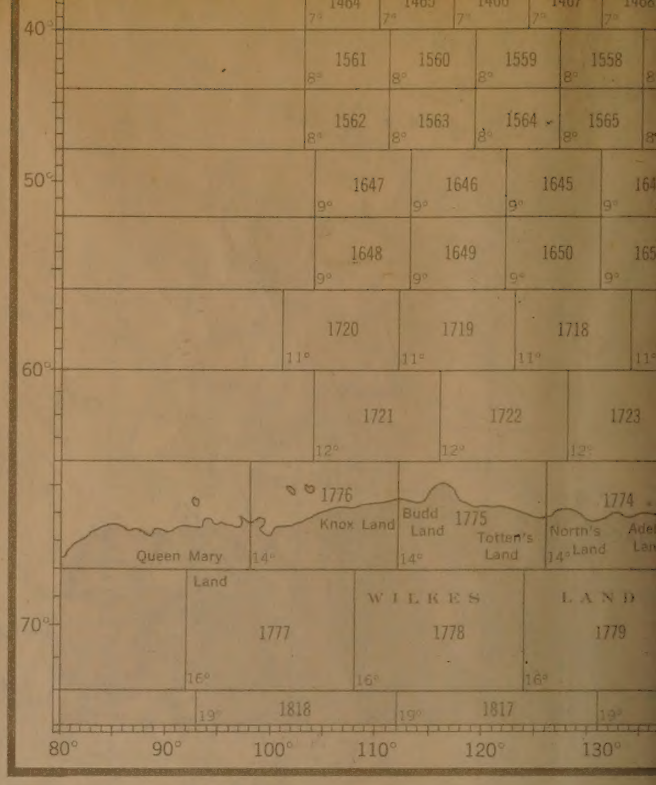

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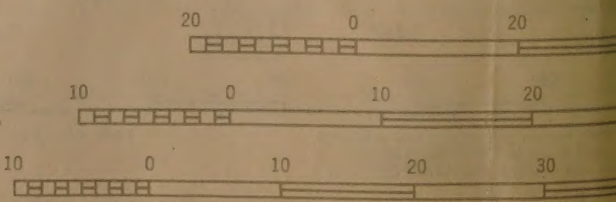

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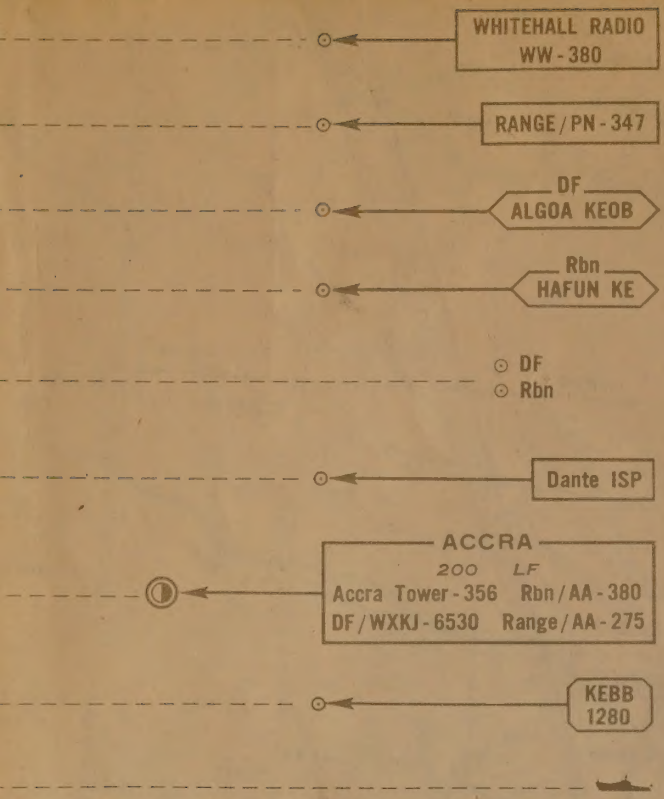

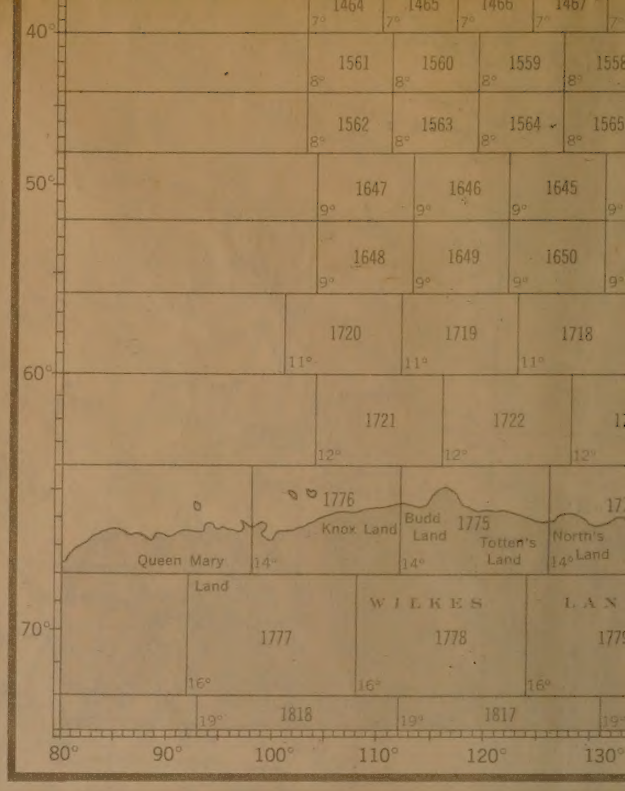

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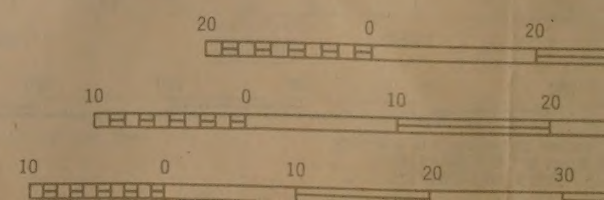

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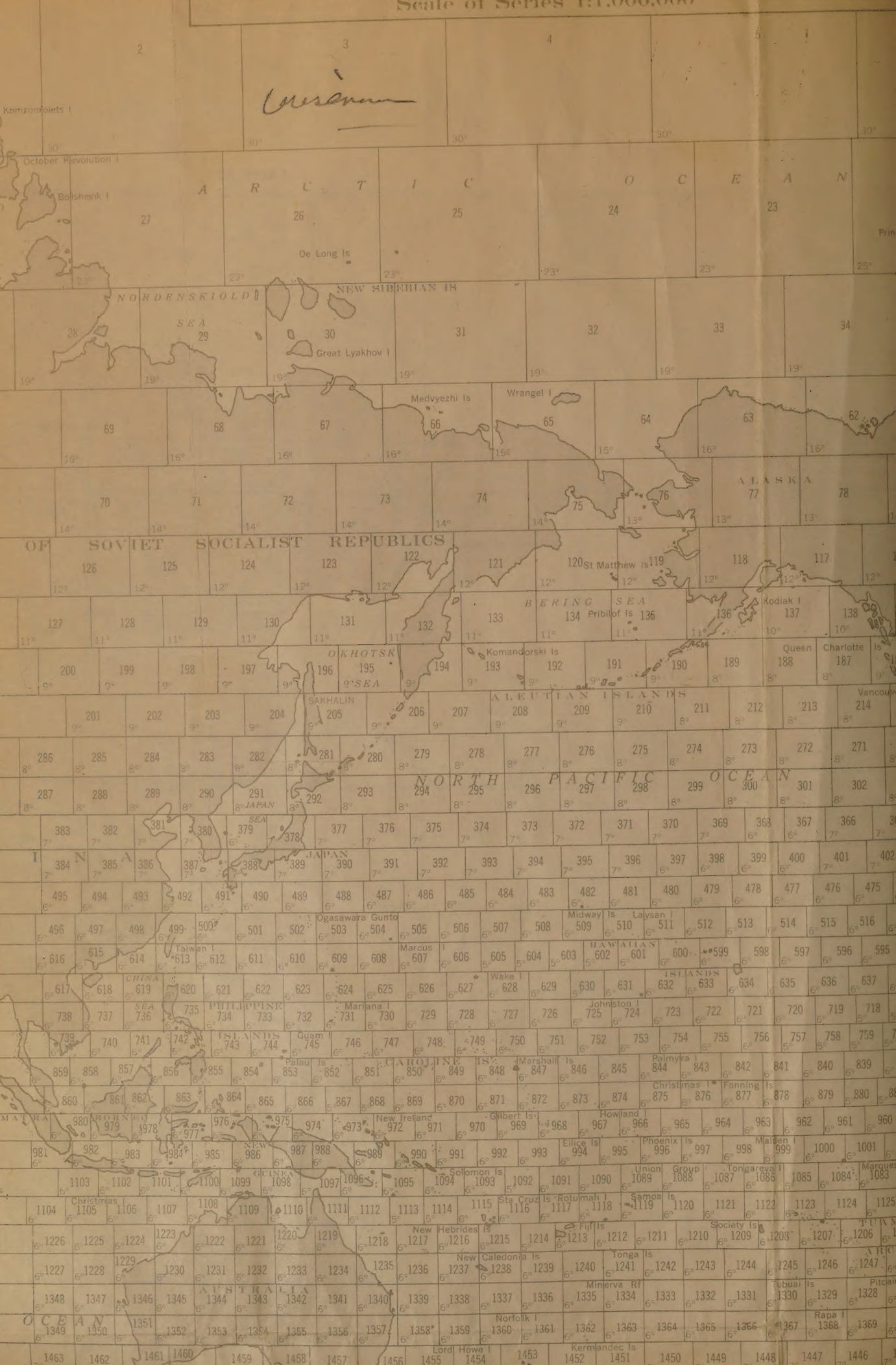
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Marques
Christmas I
Sta Cruz Is
Rotumah I
Samoa Is
New Hebrides Is
Fiji Is
Society Is
New Caledonia Is
Tonga Is
Minerva Rf
Tubuai Is
Pitcairn
AUSTRALIA
Norfolk I
Rapa I
Lord Howe I
Kermandec Is

Beyond Bettles there is some thin, scrubby spruce and thin ground cover in the uplands, with a few small clumps of trees in sheltered places.

We follow the John River into the Endicott Mountains. The valley along the John River is better drained than most I've seen in Alaska.

As we fly through (hardly over) the Endicott Mountains the plane seems to just miss the jagged rocks of the pass by a few feet. For some distance I see high, rugged, nearly barren mountains, with snow in places. There are some fine old cirques but no glaciers.

About 10:10 we pass over the main range to rolling upland with several ponds and lakes. The cover is thin and there are no trees. (KA V. 1)

Soon we are over beautiful Tundra 1/ landscape (KA V. 2). The cover is thin, but continuous and one sees a roughly hexagonal pattern of cracking. Stream channels are low. For

---

1/ This word "Tundra" is used very loosely in Alaska. By it people mean, generally, a treeless vegetation-covered landscape, with or without grass and sedges. It may or may not have frozen soil beneath. Sometimes they use it in reference to the peaty, root-matted surface soil only. Arbitrarily, in these notes I use "Tundra" for treeless, vegetation-covered soils, with or without grass and sedges, and with everfrozen subsoil. The soils have a prominent, dark-colored, humus-rich A_1 horizon and a root-matted A_0. For similar soils without everfrozen substrata I use the expression "Arctic Mountain Meadow" for the high mountain slopes and "Arctic Meadow" for the lower land, as in the Aleutian Islands. Although I may later change the definition and use of these terms, they will serve to keep this journal clear.

KA IV.9 July 12, 1946
Just north of junction of Allen River with John River south of Endicott Mountains.

KA IV.10 July 12, 1946
John River in Endicott Mountains.

KA IX.9

KA IX.10

KA IV.11 July 12, 1946
Endicott Mountains

KA IV.12 July 12, 1946
Endicott Mountains

KA IV.11 July 12, 1946
Bathcock Bloomfains

KA IV.12 July 12, 1946
Bathcock Bloomfains

KA V.1 July 12, 1946
Just north of the Brooks Range. Well drained Tundra landscape.

KA V.2 July 12, 1946
Fairly well drained Tundra between Brooks Range and Point Barrow.

KAI. 1

KAI. 2

Point Barrow
Nuwuk
Tapkaluk Is
ELSON LAGOON
Cooper I
Martin I
Christie Point
Igalik I
Tangent Pt
DEASE INLET
Abandoned Cabins
Cape Simpson
McTarish Point
Oarlock Is
Wright Pt
Fish Camp
ADMIRALTY BAY
Abandoned Cabins
SMITH
Okpiksuk R

KA V.3 July 12, 1946
Tundra landscape south of Point Barrow.

KA V.9 July 12, 1946
Tundra landscape near Point Barrow.

KAK. 3

KA V-3 July 12, 1946
Tundra landscape south of Point Barrow.

KAK. 9

KA V-9 July 12, 1946
Tundra landscape near Point Barrow.

many miles in all directions I see undulating, remarkably smooth Tundra, dissected with shallow but mature dendritic drainage.

After we pass Valley of Willows and Titaluk River, the number of lakes and ponds increases. The landscape is hard to describe and I must depend on some of the many pictures being legible. The plane is now very rough and I'm probably the only passenger who is not ill. I hope the pilot is O.K.!

As we approach Point Barrow we fly so low I can almost reach out and pick the wild flowers. Among the ponds the cover is continuous; there are practically no bare spots or rock outcrops at all. The ponds vary in color, among them, and even within the same pond. I suppose this is a matter of depth, ice, and organisms. These remind me of the Siberian ponds west of Novosibirsk, except these seem to have no regular pattern while those are circular.

We fly low over these ponds and the plane is very bumpy. Increasingly, the land shows an irregular gross hexagonal pattern of cracks. Some areas are nearly square. I see some eider ducks.

Floating ice in Admiralty Bay gives a sort of mottled or lacy effect to the smooth water.

We come down at Point Barrow on a long, dark gray, sandy, nearly barren spit at 11:30 a.m. The air is cool like autumn.

.KA V.4 July 12, 1946
Typical pond in Tundra, southeast of Point Barrow.

. KA V.5 July 12, 1946
Tundra southeast of Point Barrow.

KA V. 4

KA V. 5

We hurry to lunch, where I met Mr. Salzman, who again invited me to stay over night. I took pictures of the Arctic Ocean - half full of floating ice, part white and part blue. It is simply gorgeous with the bright sun on it. How fortunate that the day is clear and bright!

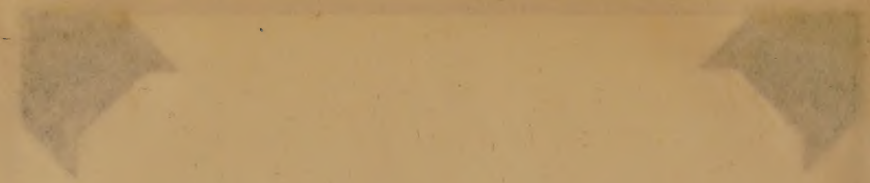
After a very rapid lunch Mr. Johnson, the meteorologist, takes us out in a weasel (= catepillar edition of the jeep). It is some ride. I tell him I am in a great hurry, since the time is far too short - and he does hurry, through water, over loose sandy beaches, and out onto the Tundra. Like other Army ground transportation, the weasel is not designed for people with sore backs!

We come to a beautiful section of Tundra on a very gentle slope to Elson Lagoon. I take a sample in the elevated portion and one in the adjacent depressed part. These sites vary about 2 feet in elevation. (See KA V. 10)

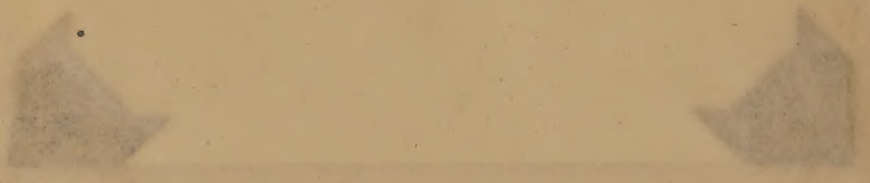
Upper site (Sample No. 10) : About $\frac{1}{2}$ the surface is bare except for gray lichens: the other $\frac{1}{2}$ is covered with prostrate willow (a tree only about 3 or 4 inches high), sedges, and other arctic plants. This is a "puff" spot some 20' across and even more long. It resembles puff Solonchak in general appearance, except that the surface is darker in color. I take soil and vegetation samples - all in such a hurry. (Now I regret very much that I did not plan to stay for a day.)

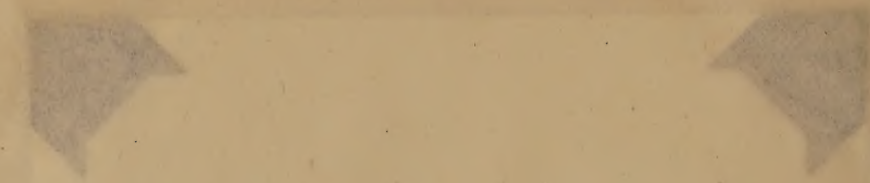
KA V.6 July 12, 1946
South of Point Barrow. Tundra landscape with ponds.

KA V.7 July 12, 1946
Arctic Ocean at Point Barrow.



KAE.6





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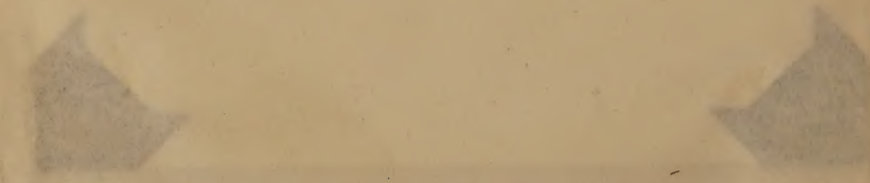


$A_{1.1}$ 0-3" [1/] Weak brown loam, rich in humus and with many fine roots.

$A_{1.2}$ 3-11" Weak brown loam, almost mushy so rich in humus. Not many roots.

Upper permafrost 11-12 + Brownish-black organic loam. Frozen very hard. Streaked and mottled with white ice.

Lower site (Sample No. 11): About 12 feet away from the upper site. There is a continuous cover of dense sod of sedges with some moss. I collect samples of soil and vegetation.

A_1 0-3" Dusky brown loam with many roots of sedges and some moss. A tough turf.

C_1 3-9" Grayish-brown and dusky brown, mottled, with spots of moderate brown, wet clay loam, rich in organic matter.

Permafrost at 9 inches.

We hurry back to the airstrip, plowing through the loose, dark gray sand of the spit. The plane has a big load of lumber and machinery for Umiat, and a few passengers, including one Eskimo young lady with a nice smile. As we strap ourselves into the bucket seats, I hear the pilot say to the co-pilot: "We'll try half the runway, and if she won't get up, we'll bring her back and unload part of this stuff." We are in the air at 1:15 p.m.

In the beds of some streams flowing into Elson Lagoon and Admiralty Bay are fairly wide barren sand flats with evidence of wind drift.

1/ This horizon nomenclature is questionable.

A	0–3"	Dark brown loam, rich in humus and with many fine roots.
A2	3–12"	Dark brown loam, almost murky in color in humus. Not many roots.
Upper B2 and parafrost	12+	Fibrous-block organic loam. Frozen very hard. Streaked and mottled with white ice.

Lower site (Sample No. 11): About 12 feet away from the upper site. There is a continuous cover of dense sod of native sedge roots. I collect samples of soil and vegetation.

A	0–3"	Dusky brown loam with many roots of sedges and some moss. A tough mat.
C	3–"	Greyish-brown and dusky brown, mottled, with specks of moderate brown, wet clay loam, rich in organic matter.

Permafrost at 3 inches.

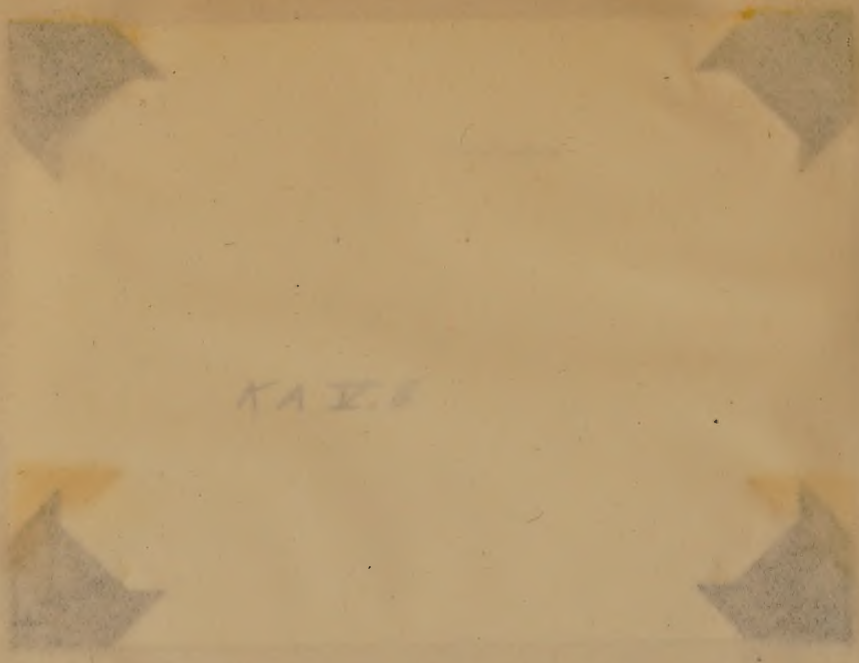
We hurry back to the airstrip, plowing through the loose, dark clay sand of the spit. The plane has a big load of luggage and machinery for Unalakleet, and a few passengers, including one smiling young lady with a nice smile. As we step ourselves into the bucket seats, I hear the pilot say to the co-pilot: "We'll try half the runway, and if she won't get up, we'll bring her back and unload part of this stuff." We are in the air at 1:15 p.m.

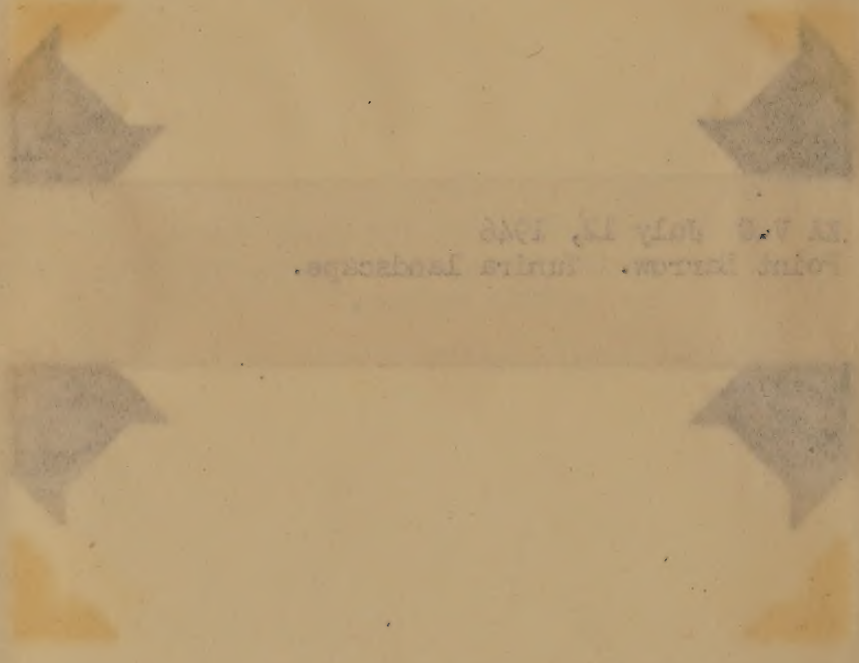
In the belt of tone spruce flowing into Elbow Lagoon and Admiralty Bay are daily pike banquets and flats with cyclones of wild fowl.

1/ This nonsense nomenclature is quotation.

KA V.8 July 12, 1946
Point Barrow. Tundra landscape.

KA V.11 July 12, 1946
Near Point Barrow. Tundra landscape.





KA V.10 July 12, 1946
Near Point Barrow. Excellent view of Tundra with typical elevation at left and depression at right. Site of Tundra samples Nos. 10 and 11.

KA E. 10

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230
220
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200
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155°
30°E
154°
153°
32°E
152°
(Joins 33) (Water)
T I C
Point Barrow
Plover Islands
Elson Lagoon
BARROW
Barrow
Christie Point
Dease Inlet
McTavish Point
Abandoned Houses
Cape Simpson
Oarlock Island
Wright Point
Admiralty Bay
Abandoned Houses
SMITH BAY
Pitt Point
Cape Halkett
Cape Halkett
HARRISON
Miguakiak River
Teshekpuk Lake
Chipp River
Topagoruk River
Atiga
UNSURVEYED
ANNUAL MAGNETIC CHANGE
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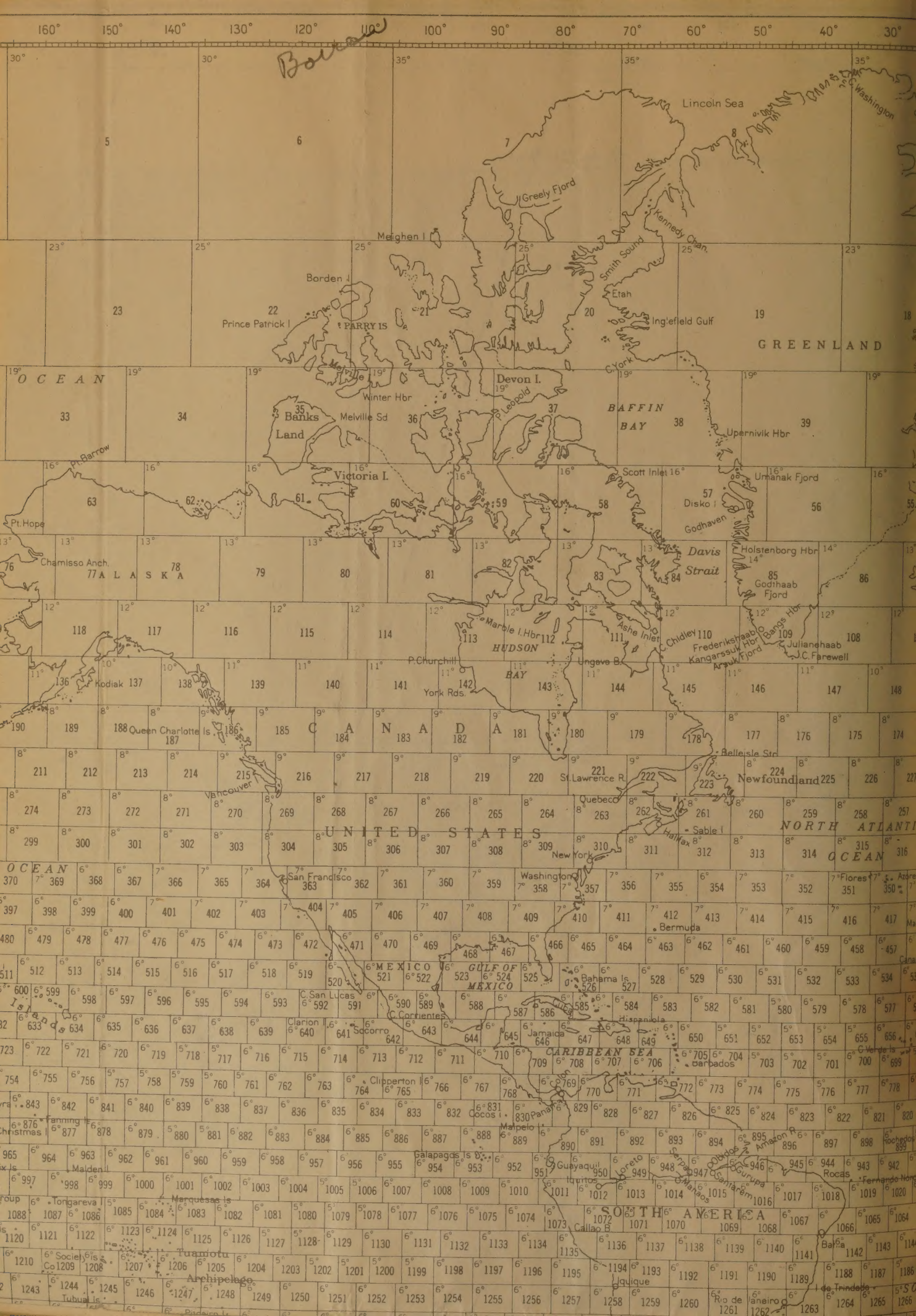
DECREASE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Kennedy Chan.
Smith Sound
Melghen I.
Borden I.
Etah
Prince Patrick I.
PARRY IS.
Inglefield Gulf
GREENLAND
Devon I.
Winter Hbr
Melville Sd
Banks Land
Pt. Leopold
BAFFIN BAY
Upernivik Hbr
Pt. Barrow
Victoria I.
Scott Inlet
Umanak Fjord
Disko I.
Godhaven
Pt. Hope
Chamisso Anch.
ALASKA
Davis Strait
Holstenborg Hbr
Godthaab Fjord
Marble I. Hbr
HUDSON BAY
Ashe Inlet
Chidley
Frederikshaab
Kangarssuk Fjord
Bangs Hbr
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P. Churchill
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York Rds.
Kodiak
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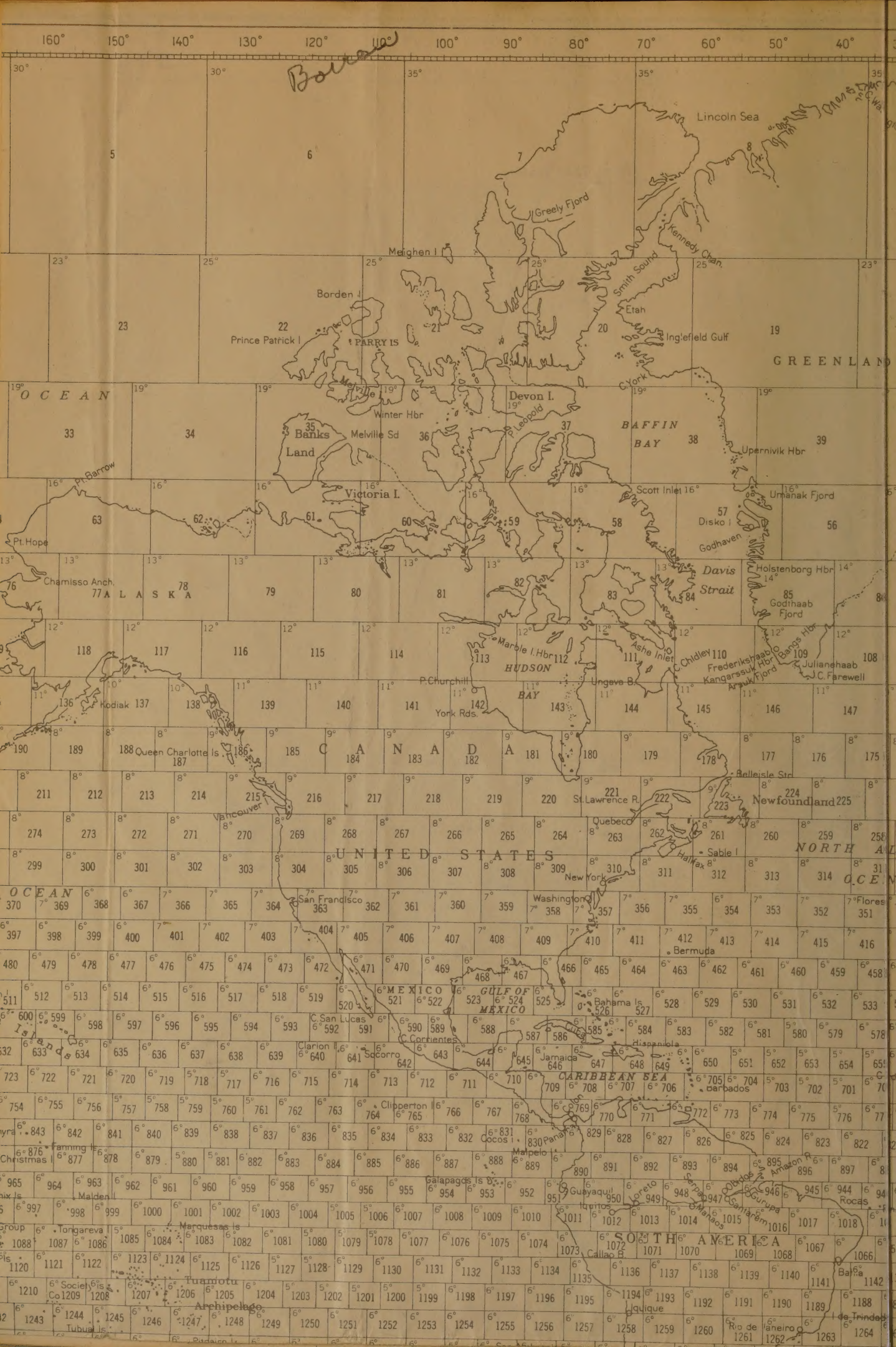
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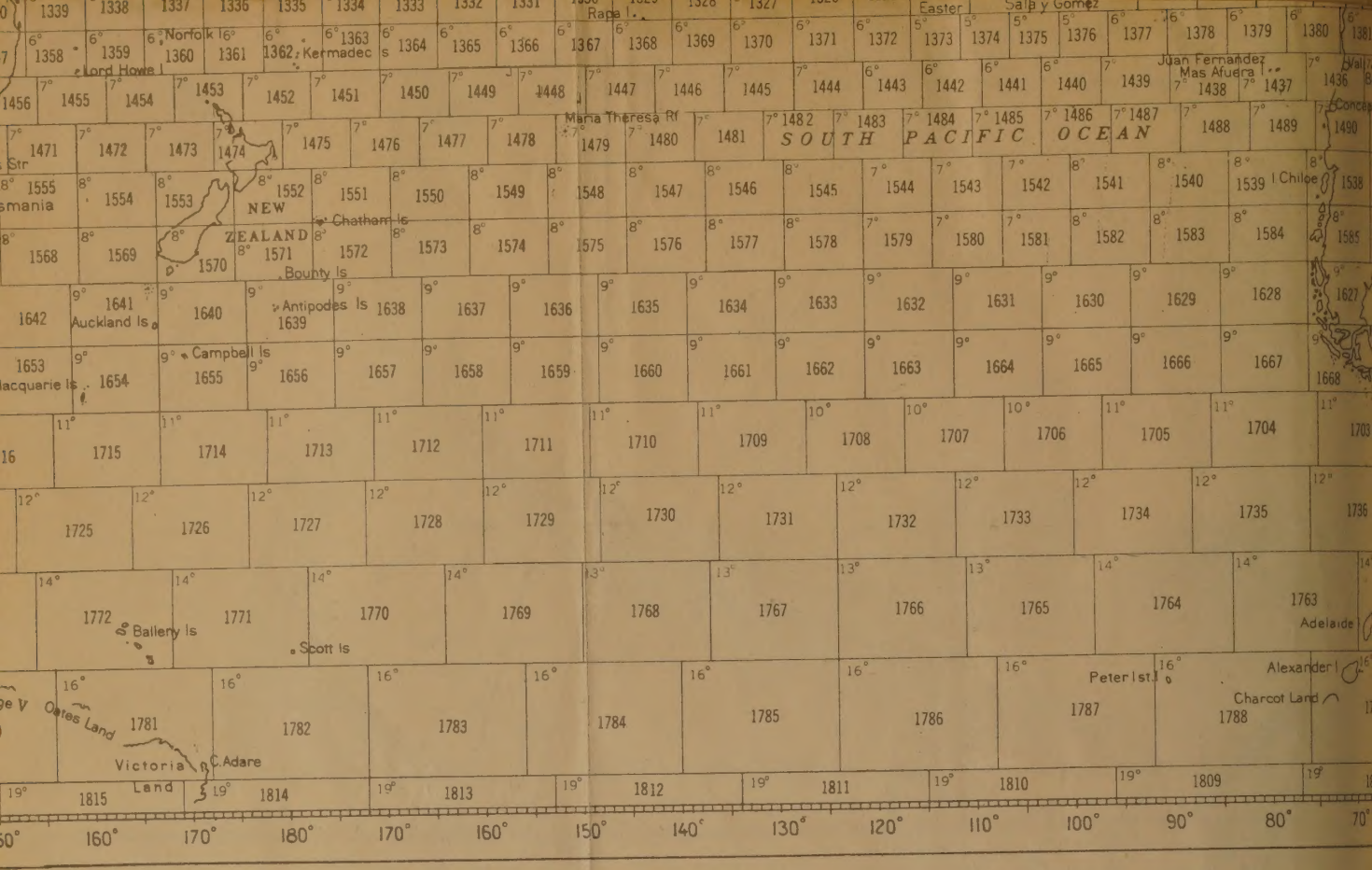

WORLD PILOTAGE CH

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RAILROADS ONE TRACK

TUNNEL

MAIN ROADS

SECONDARY ROADS

TRAILS

RESERVOIRS

MINES AND QUARRIES

WELLS AND WATER HOLES

CANAL

REEFS AND SHOALS

We fly very low, and it is bumpy. We leave ripples in the ponds! About 100 to 125 miles southeast of Point Barrow we come onto somewhat higher ground. The lakes near Admiralty Bay have very shallow margins, but now many of the lakes have banks 5 to 20 feet high.

At about 180 miles there are some gullies, which are especially green, but the land is well covered with brownish-green vegetation. I see almost no bare ground except for a very few cut-banks. There is almost no Lithosol at all here north of the Brooks Range; although just before coming into the valley of the Colville River I see hilly land with a little Lithosol. We are down at Umiat on the Colville River (near Oil Seep on the maps) at 2:31 p.m.

While the plane is being unloaded I walk out into the low, flat, wet, mosquito-infested[1/] alluvial plain. The surface soil of a few inches to more (how much?) is dark brown and peaty. Underneath is coarse gravel of medium-dark colored rocks. Among the low shrubs and moss there is quite a bit of sedge. Many ponds are scattered over the low wet plain.

We are again in the air at 3:30 p.m. with a much lighter load. South of the Colville, the amount of dissection increases

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1/ Had it not been for the heavy alcohol repellent furnished us, I should have suffered terribly from these pesky insects.

KA V.12 July 12, 1946
Near Umiat. Landscape of low alluvial plain of the Colville River.

KA VI.1 July 12, 1946
Near Umiat. Landscape of low alluvial plain of the Colville River. (Another view)

but still there is very little bare land. Tundra. At about 60 miles, the drainage channels are closer together and the land is more hilly. Some of the ponds definitely have ice in them.

After we cross the Anaktuvuk River low, bare mountain peaks come into view. At about 100 miles we are again going over the high very jagged peaks of the Endicott Mountains. The dark gray rocks, likely sedimentary, are very jagged and, except for some snow, are barren. We miss some of these peaks by inches!

A little way south of Mt. Doonerak I see some red outcrops that look like scoria. A few trees appear about 60 miles north of Wiseman.1/ The North and Middle forks of the Koyukuk join in a broad swampy alluvial plain. We see some snow banks on the higher hills as we fly on south.

Dall is in a big alluvial swamp with many ponds and clumps of trees.

We cross the mighty Yukon a little south of Stevens. Here the river valley is fairly narrow, with uplands on either side. I see trees only on the lower slopes.

In a few minutes the pilot turns sharply and circles to see the cause of a little forest fire. It apparently is not a down plane.

1/ Made famous by Marshall's Arctic Village.

As we come down onto Ladd Field I hear the young Eskimo lady exclaim after seeing a tree and an automobile for the first time! We reach the airport at 5:38 and are back to the hotel about 6:30 - very tired but pleased. This was one of the most interesting days I've ever had. I should have taken 2 days; it was a serious mistake in judgment to have refused their offer. On the whole trip we saw very few signs of either men or animals, except at the landing areas.

July 13: Permafrost station near Fairbanks

In the morning I take care of the Tundra samples from Point Barrow. Then I buy some more clothing to wear in the field. The black peaty surface layers of these soils certainly get our clothing soiled in a hurry. Luckily, I am also able to buy some kodachrome film, which apparently is in very short supply.

After lunch I am taken to the permafrost station, installed by the Army, by Mr. B. L. Trawicky, now in charge.

First, he shows us a flowing well that had been put in at great expense. They had not expected a flowing well and the whole surface gave way, when the water came up. Finally it was filled with concrete around the main pipe and the well saved.

I am shown three large plots, one with the whole natural cover, one with the trees removed but the ground cover left, and a third with trees, ground cover, and surface moss removed, as in clearing for farm use. In fact, they went a little too far in the third plot and removed part of the A_1 as well as A_0. Several thermocouples have been installed so that temperature readings of the soil may be taken to 30 feet. It is planned to have readings taken every 6 hours for a year or so at least!

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I am shown three large plots, one with the whole natural cover, one with the trees removed but the ground cover left, and a third with trees, ground cover, and surface moss removed, as in clearing for farm use. In fact, they went a little too far in the third plot and removed part of the A_2 as well as A_1. Several thermocouples have been installed so that temperature readings of the soil may be taken to 30 feet. It is planned to have readings taken every 6 hours for a year or so at least!

KA VI.2 July 13, 1946
Near Fairbanks on permafrost experimental plots.
Note spruce tipping toward rabbit trail because of
deeper melting of permafrost. Typical virgin forest.

KA VI.3 July 13, 1946
Near Fairbanks. Close-up of "niggerhead."

These plots are located on a local alluvium associate of the Tanana soil. Picture KA VII.2 is taken on these plots, looking from the second to the first. In the center of this picture is shown a little rabbit trail leading into the woods. In the cut-over plot frost is found at 30", except in the rabbit trail, where it is 38". Note how the trees are tipped slightly toward the trail as a result of the animals packing the moss and reducing the insulation.

In the deep woods, permafrost is reached now at 18".

The soil here is about like that first described July 10.

Also several important experimental buildings are being constructed with different sorts of foundations, in order to find out how best to handle the problem of foundation over permafrost. Although developed because of probable military needs, I see no reason why the results are not as directly applicable to farm buildings as if the experiments were set up for that purpose, assuming that the work will be conducted competently. I am exceedingly well impressed with Mr. Trawicky. He seems very interested in any applications his researches might have toward agricultural development in the area.

Among other foundations are the following: (1) Natural ground surface, (2) the permafrost, (3) 6-foot gravel fill, (4) 3-foot gravel fill, and (5) 6" cell-concrete insulation

in the center of a 4-foot gravel fill.

In addition, are large strips of experimental pavements with these several kinds of insulation, and others, including moss. This large area had first been denuded of vegetation and the dark-colored, highly organic surface soil.

I walk out into a nearby swamp and take a picture of a "niggerhead." (KA VI.3) These are tall tufts of grass and grass roots, some 8 to 15 inches in diameter, surrounded by soft wet, peaty soil at their bases. In the niggerhead swamps, the tufts are spaced about 12 to 18 inches apart and take up somewhat less than one-half the area. The tufts are rounded and wobbly. I've seen them taller than these, say up to 2 feet. I've heard of them 4 feet high but should need to see to believe. This sort of wet landscape is exceedingly difficult to walk over, especially in summer, and there is a lot of it in Alaska.

There is obvious need for this permafrost work to be coordinated, at least a little, with that of the U. S. Geological Survey. The latter has apparently begun an entirely independent investigation of permafrost. A leader has been appointed and has arrived in Fairbanks, but Trawicky is still unable to find him anywhere! I am sure this work with permafrost will have a direct bearing on the big problem of farm water supply.

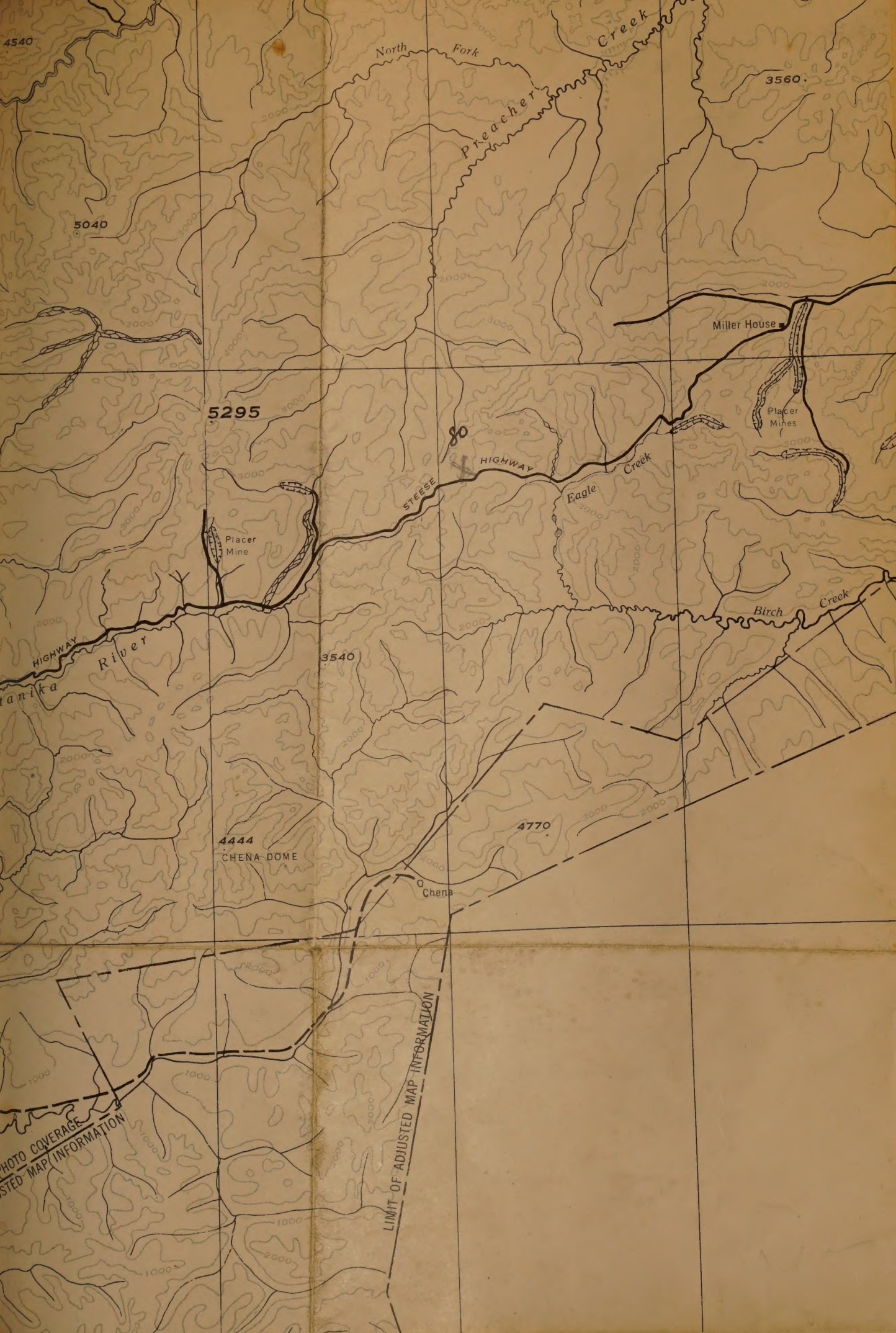
In the evening, Charles McGrath and a Mr. Palmer - formerly manager of the local farm cooperative - came to see me about a scheme for producing soup out of potatoes from Fairbanks and fish heads and tails from the coastal region of Alaska, according to a process developed by a Mr. "Z." I had already gone to bed very tired and sleepy. I cannot get a very clear picture of the deal, but it looks shady to me. McGrath is very enthusiastic, however, and thinks the leaders of the Farm Coop foolish not to jump at the proposition. For this, and other reasons, McGrath and Palmer are organizing another cooperative. I tell McGrath probably this is unwise and he will soon find it out. On the "Z" scheme I can give no advice.

July 14: Fairbanks to Circle Hot Springs

We are up early for a good start. Savage is driving a rented car (much easier for my back) and Nygard and Ellis are along. We drive over the same road to Fox that we took July 11 and then east along the Chatanika River on the Steese highway. Much of this alluvial valley has been and is being worked for gold - and left in a perfectly terrible mess of stone and cobble piles.

Out about 25 miles we look at the land near Summit, some 8 miles west, by road, from Chatanika. These hills are just above the timber line. The soil is lithosolic Arctic Mountain Meadow from schist. Part is more nearly Lithosol. We see carex, some poa and fescues, and blue top, but, on the whole, not much grass despite the nearly continuous green cover. The principal plants are willow (about 2 feet high to as high as a man's head), dwarf birch, ledum, blueberry, dwarf (or mountain) cranberry, black bearberry, mosses, lichens, ferns, crowberry (Empetrum nigrum), ferns, small black spruce, and other arctic species. One sees a few trails but no recent evidence of animals.

Beyond Chatanika, strip mining for gold has completely ruined most of the valley land. It would be a relatively simple mechanical matter to change the machinery so that the


4540
North Fork
Preacher Creek
3560
5040
Miller House
5295
Placer Mines
STEESE HIGHWAY
Eagle Creek
Placer Mine
Birch Creek
HIGHWAY
tanika River
3540
4770
4444
CHENA DOME
Chena
LIMIT OF ADJUSTED MAP INFORMATION
HOTO COVERAGE
STED MAP INFORMATION

circle Hot Spot
Trig

surface of the tailings would be left comparatively smooth. Then aspen and other plants would take over rather soon and a new cover develop. As it is now these areas are left so one can scarcely walk over them at all, and only with great effort. In a country with few roads these wide strips of tailings make great barriers to travel for people needing to cross the valleys.

There is quite a bit of blue stem grass, along with fireweed, where the soil has been disturbed (but the solum not removed), as along the highway and in old camping sites. The disturbance caused by one passage through the brush of a heavy "cat" is enough. On the hills is a fair stand of second-growth aspen, white birch, and spruce. On the headwaters of the Chatanika River we see stands of black spruce on the Gilmore soil from schist rock just below the timber line. I take kodachromes of this site, in the rain, and of beautiful soil creep scars just above the timber line near the divide between the Chatanika and Eagle Creek.

On a gentle slope of about 3% on this divide (Twelve-mile Summit; elevation, 3225 ft.) I examined and sampled (No. 14?) the soil in the rain. The cover consists of the usual arctic mixture of ledum, dwarf willow, dwarf birch, carex, and so on. The soil could be described as an Arctic

KA VI.4 July 14, 1946
Near 12-Mile Summit, east of Fairbanks. Landscape at 3225 feet where profile is described.

KA VI.5 July 14, 1946
65 miles west of Circle. View on stream terrace a trifle below the timber line.

KA III. 4

KA III. 5

Mountain Meadow - leaning toward a Half-Bog (See KA VI.4).

Sample (No. 14?)

A_0	$3\frac{1}{2}$-0	Brown, raw, fibrous peat.
A_1	0-5"	Brown, slightly decomposed, mottled fine fibrous peat. Very wet.
G_1	5-10"	Dark gray, mottled with both olive and brown, silt loam, with some grit and pebbles. Quite a few roots. Soggy and somewhat sticky.
(F)	10-12"	Frozen subsoil similar to the layer above.

A few miles beyond I see cuts exposing quartzite with veins of mica. Near this cut is a stream valley still covered with ice and snow (KA VI.5).

On the upper watershed of Eagle Creek, I see an Arctic Lithosol with a cover of mosses, dwarf birch, carex, etc., developed from a schist-like rock, much harder than usual (KA VI.6).

About 3 miles east of Miller House we come down on a broad plain that appears to extend to the Yukon. I look at the soil on a gentle (3%) slope toward the stream - a tributary of Birch Creek. The cover is chiefly black spruce with mosses, ledum, blueberry, etc. The soil is now imperfectly drained but is potentially good for crops (although temperature and rainfall may be inadequate). (See KA VI.7).

KA VI.6 July 14, 1946
A little west of Miller House. A close view of soil surface of Arctic Lithosol.

KA VI.7 July 14, 1946
About 3 miles east of Miller House. Landscape of soil described on west side of tributary of Birch Creek.

KA III 6

KA III 7

A_0	3-0	Yellowish-brown peat.
A_1	0-1"	Dark brown humus soil.
B	1-12"	Brown sandy clay loam mottled with dark gray and "rusty" brown.
C	12 +	Like above but more gray and increasing amounts of small stones and pebbles.

Frost at 25 inches.

As we drive on east, this soil area continues. It looks good. Some places are wetter, others drier. The large first bottom along Birch Creek is quite wet.

We turn south on a side road to Circle Hot Springs on similar soil that seems to have a substratum of Pleistocene(?) gravels. The land appears to be about one-third fairly dry, about one-third swamp, and about one-third intermediate. Likely to the left of the road, toward the streams, the proportion of wet land increases.

We arrive at Circle Hot Springs Hotel, at the head of a small valley, about 4:45 p.m. After a short rest, I go out to look at the spring and garden.

In a small cove a large spring of nearly boiling mineralized water comes out of the ground (with everfrozen subsoil only a few yards away!) This water is used for baths (which presumably cure arthritis!), for heating the hotel, and for heating a fair-sized vegetable garden.

In the garden hot water runs through 4 pipes laid in the ground. The soil is really too warm; a few inches below the surface it is 75° to 84°. Some humus soil has been brought in to increase the depth of A_1. This little cove is filled with outwash materials. Phosphate, potash, and nitrogen fertilizers are used, in uncertain but rather large amounts. Some Bison tomatoes are grown in the open and cucumbers under glass. Cabbage is well headed. There are nice carrots, beets, potatoes, broccoli, and rhubarb. The celery is fair, but many plants are somewhat chlorotic. (See KA V.9).

The slope just north of the hotel looks to me like glacial till, although an old timer at the hotel - said to be a geologist - thinks not. It may be colluvium, or mud flow, but I still think it is till.

Mr. Leach at the hotel tells me that frosts may be expected in July on the land I looked at this afternoon in 3 years out of 4!

After dinner I try the hot bath. It really <u>is</u> hot water. I stay in as long as I can stand it and go to bed well wrapped. I have a good sweat and am well relaxed for sleep.

KA VI.9 July 15, 1946
Circle Hot Springs. Vegetable garden heated by hot water in underground pipes.

Circle Hot Springs

CIRCLE HOT SPRINGS, ALASKA

A Beautiful Health Resort in the Big-Game Hunting Country

Located 30 Miles Southwest of Circle, 130 Miles Northeast of Fairbanks, on the Graveled Steese Highway

Modern Hotel and Cabins, Hot Water Heat Piped from the Springs • 1,000,000-Gallon Bathing Pool of Warm Mineral Water, With Sand Beach • Bath House With Dressing Rooms and Pools • Flow of Hot Mineral Water: 400 Gals. Per Min.; Temperature 139° F.

Especially effective in all forms of arthritis, rheumatism, congested and torpid liver, digestive disorders, etc. Very beneficial to the eyes.

COMPARISON OF MINERAL ANALYSES OF THE WATERS OF THESE SPRINGS WITH OTHER GREAT HOT MINERAL SPRINGS

(Parts Per Million)

	CIRCLE HOT SPRINGS Circle Hot Springs, Alaska	BIG IRON SPRINGS Hot Springs, Arkansas	MARIEN-QUELLE Bavaria	CHENA HOT SPRINGS Chena Hot Springs, Alaska
Silica (SiO2)	82.	46.	0.	77.
Iron (Fe)	1.3	.19	2.7	1.2
Calcium (Ca)	29.	47.	132.	2.3
Magnesium (Mg)	2.1	5.1	40.	1.2
Sodium and Potassium (Ma & K)	257.*	6.3§	982.	94.
Carbonate Radical (CO3)	0.	0.	0.	0.
Bicarbonate Radical (HC03)	173.	168.	513.	118.
Sulphate Radical (SO4)	98.	7.8	Trace	78.
Chlorine (Cl)	252.	2.5	1566.	26.
Nitrate Radical	0.	.44	0.	0.
TOTAL SOLIDS	816.	283.23	942.	398.

* Includes 2.4 Potassium. § Includes 1.6 Potassium.

JOHN R. BERDAHL, *Manager*

Hotel and Cottage Accommodations for 160 People. Lowest Living Costs in Interior Alaska.

July 15: Circle Hot Springs, Circle (on the Yukon) and back to Fairbanks

Iver and I are up early but see no signs of breakfast. So we go out on the smooth upland just east of hotel to examine the soil and take a sample. This is an undulating plain with about 2 to 4% slope. It may be glacial till - at least it looks like it to me. There is a thick stand of young aspen following what must have been a severe fire. There is also some young spruce and the usual ground cover of blueberry, low-bush cranberry, crowberry, etc. The land is quite dry. The mosquitoes are the thickest I've ever seen them. They make a brown haze in the two-foot layer of air above the soil. We take samples of the soil and aspen leaves.

Sample No. 15 [1]

A_{00}	2-1"	Last year's aspen leaves, twigs, crowberry, etc.
A_0	1-0	Brown matted roots and dead organic matter.
A_1	-	Practically absent.
A_2	0-2"	Brownish-gray sandy loam, variegated with light gray. Ashy. Many roots. This layer varies from $\frac{1}{2}$" to 3" in depth.
B_1	2-5"	Yellowish-brown fine sandy loam. Suggestion of both platy and blocky structure in place, but imperfectly granular when disturbed. Transitional.

1/ May be incorrectly labeled 15.

July 14: Cicada Hot Springs, Cicada (on the Yukon) and back to Whitehorse

Ivar and I are up early but see no signs of breakfast. So we go out on the mossy upland just east of hotel to examine the soil and take a sample. This is an undulating plain with about 2 to 4% slope. It may be glacial till - as Ivar's it looks like it to me. There is a thick stand of young aspen following what must have been a severe fire. There is also some young spruce and the usual ground cover of blueberry, low-bush cranberry, crowberry, etc. The land is quite dry. The mosquitoes are the thickest I've ever seen them. They make a brown haze in the two-foot layer of air above the soil. We take samples of the soil and aspen leaves.

Sample No. 15 1/

A_{00}	2-1"	Last year's aspen leaves, twigs, cranberry, etc.
A_0	1-0	Brown matted roots and dead organic matter.
A_1	-	Practically absent.
A_2	0-2"	Brownish-gray sandy loam, varicolored with light gray. Many roots. This layer varies from ½" to 3" in depth.
B_1	2-5"	Yellowish-brown fine sandy loam. Suggestion of both platy and blocky structure in place, but imperfectly granular when disturbed. Transitional.

1/ May be incorrectly labeled 15.

Sample No. 15 (cont'd)

B_2	5-11"	Moderate brown to yellowish-brown loam. Very weak blocky structure, easily friable to medium granular. Irregular horizon boundaries.
C	11-18 +	Light yellowish brown stony, sandy loam - or sandy, clayey, stony till. Loose and porous.

In a road cut nearby I take pictures of the profile (KA VII.8). (Later: Also my best kodachrome from Alaska.) Then before breakfast I get a few pictures of the gardens, with parsnips in the foreground, then chard and carrots; the hot spring is in the far background; and cabbages and tomatoes are on the hillside.

Now we go in to an excellent breakfast.

After breakfast we drive a short way north of the hotel, out toward the lowland, and walk a little way to Red Oaks' place. He has a house and a partly completed barn. He lets saddle horses to people at the hotel and, during the winter, to hunters whom he serves as a licensed guide. The house and barn are on a low cobbly terrace of local alluvium with $\frac{1}{2}$ to $1\frac{1}{2}\%$ slope. We start for the hay field (about a mile away) over a rough trail in spruce and willow on an imperfectly drained, nearly level, fine sandy loam terrace underlain with gravel.

KA VI.8 July 15, 1946
Circle Hot Springs. Shallow Podzol on glacial till, colluvium, or old mud flow deposit.

KA VI.10 July 15, 1946
Circle Hot Springs. View of second growth aspen where Podzol profile was sampled.

KA III. 8

Fig VI-8 July 12, 1945
Chrysolepis Hot Springs. Shallow fossil on glacial till, colluvium, or old mud flow deposit.

KA III. 10

Fig VI-10 July 12, 1945
Chrysolepis Hot Springs. View of second gravel terrace where fossil profile was sampled.

The meadow was cleared of willow about 1920 and mowed for 8 or 9 years. It was left without mowing (but was burned twice) until 1945. Oaks and his man are just starting to cut hay. Originally this irregular field was a Half-bog, now it is well covered with blue top and carex. It is imperfectly drained. I decide to sample the surface soil and grass in the drier part (No. 15)[1/] and moist part (No. 16), and not sample the still wetter areas. The heaviest stand of grass is on the soil (No. 16) of intermediate drainage.

Sample No. 15 (See KA VI.11)

A_0 and A_1	0-2" or 4"	Brown peat and root mat. Shows evidence of burning.
G	4-(about) 12"	Grayish-brown silt loam mottled with brown and dark brown. Many roots.

Frost deep - more than 30".

Sample No. 16 (About 50' from above)

A_0 and A_1	0-9"	Brown fibrous peat.
G	9-(about) 15"	Dark gray wet silt loam, mottled with brown.

Frost deep - more than 30".

I take several kodachromes and hurry back. Time is slipping away.

We leave Circle Hot Springs about 10:00 a.m., drive out to the main road, and continue on toward Circle. If the

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1/ There may be an error or duplication in No.15 with the previous sample; but the soils are entirely unlike.

KA VI.11 July 15, 1946
A little way north of Circle Hot Springs.
Imperfectly drained grassland on Red Oak's place where samples were taken.

KA III. 11

boat is in we shall pick up Aamodt and Orr.

Along this road are several hills, or ridges of gray fine sandy wind-blown material (loess or dune sand?). Just after crossing Birch Creek we see what appear to be remnants of high, gravelly terraces, covered with wind-blown very fine sand. These are rather heavily forested with black spruce, along with some white spruce, white birch, aspen, and willow. We hurry on now to Circle.

We get our lunch in the local trading post - sardines and crackers. The boat will not be in for two days.

In its day Circle was undoubtedly quite a place. Now it has a few miserable shacks, inhabitated mostly by Indians and "breeds." Back of the store I see a little quack grass hayfield from which hay is being harvested. The soil is on a well-drained deep sandy terrace. I walk about the village for a few minutes and take a few pictures. The Indians object to personal pictures. When they see the cameras open the squaws call their children in the native tongue. I wonder what they call me? Probably as well that I don't understand. They have a fish wheel in the Yukon and I see fish being cooked for the dogs in an iron kettle. I presume the village has about 70 souls.

KA VI.12 July 15, 1946
The mighty Yukon at Circle.

KA VII.1 July 15, 1946
25 miles west of Circle. Nice stand of white birch, willow, white and black spruce, etc., on nearly level, gray silty very fine sandy loam. Good soil.

We turn back toward Fairbanks. Three miles west of Circle (from the first hogback west of the Yukon River) Iver takes a sample of uniform gray silty very fine sand that certainly appears to be wind-blown. The soil appears to be a young Brown Forest soil with spruce, white birch, and aspen forest. At 12 miles west of Circle another is taken. I see no evidence of stratification in the fine material at either place.

East of Birch Creek there are several high ridges that resemble kames (although it is doubtful that they are) with silty coverings. Artimesia frigida grows on the steep road cuts.

Just west of Birch Creek I note a large area of smooth, imperfectly drained soil on gravel - close to Half-Bog.

About 25 miles west of Circle is a smooth-lying nearly level soil, well drained for Alaska. Beneath the surface brown layer is slightly mottled gray silty very fine sandy loam. It has a good stand of white spruce, black spruce, white birch, and willow. This should be good soil for farming if climate and other conditions were favorable, which they are not - not now at least. (See KA VII.1)

A short way west of the branch road to Circle Hot Springs I look briefly at the soil on a well-drained natural levee along a branch of Birch Creek. It is a brown

very fine sandy loam over light brown fine sand and supports an excellent stand of spruce and white birch.

This Birch Creek bottom has a complicated pattern of terraces, levees, and channels. The terraces vary from well drained to wet and from cobbly to silty. Then there are a few high "islands" of soil from the country rock.

We hurry west and run into heavy rain on the divide between the Yukon and Tanana drainage, near Eagle Summit. We drive out of it before reaching Chatanika; and then run out of gas 29 miles out of Fairbanks! Our other car comes along in about a half-hour with extra gas and we get to our hotel at 8:50 p.m.

Mr. Prince, local representative of the Bureau of Engomology and Plant Quarrantine, asked me if our group would agree to a request of some of the local farmers that we listen to both sides of a dispute in the local farmer association - and render a decision. Of course not. What a perfect way to get into trouble!

It may be that the baths at Circle Hot Springs are good for arthritis, but certainly it takes more than one, for mine is very bad this night.

July 16: In Fairbanks

I go down to the railway station to see about getting a speeder for the trip down to Matanuska. The agent, Mr. Jennings, refers me to Colonel Johnson, in charge of the railroad and now in Fairbanks. I finally find him and make tentative arrangements for three of us to make the trip with a Mr. Sessions, out of Col. Johnson's office in Anchorage, and his wife, starting day after tomorrow.

I send films back to the office, get cases for packing samples, and clear up my "office" work.

Fairbanks is the business, social, and communications center for all northern and central Alaska. In fact, it would seem to me to be the most logical city for Capitol of Alaska in many respects, except for the fishing trade - now the biggest enterprise (followed by gold mining and then furs). It is a warm, dusty city in summer. When comin from the country one can see a great cloud of dust over it; there is no wind to blow it away. There are no first-class hotels. It seems to me that with a good hotel and other proper facilities, tourists might become very important.

There are many stores and one can buy almost anything he needs within reason, so far as I can tell, but likely not Paris gowns, objects d'art a la 5th Avenue, nor many

kinds of books. Yet Alaskans read more good books on the average, I suspect, than most people in the States - or rather on the "outside" (= the Hawaiian term "mainland").

Fairbanks has many saloons - some 40 licenses or better. And they are very well patronized. People throw away enormous sums for whiskey, which is expensive itself, to say nothing of the bad secondary effects. Indirectly, it is killing the Indians from tuberculosis, pneumonia, and venereal diseases.

One section of Fairbanks, possibly about 2½ or 3 blocks altogether, has relatively small houses with heavy ½-inch mesh screen over the windows and doors. Several appear to have tiny bars in the front rooms. Occasional houses in this area, without the screens or bars, have notices on the door, "Private house." The Military Police from Ladd Field have a headquarters in a house on the edge of the district. Handy.

The University and Agricultural Experiment Station are about 5 miles away. There is regular bus service but most students stay in dormitories at the College, I believe.

Fairbanks draws its chief support from gold mining although outfitting trappers, communications (air and railway), and agriculture are important. Now Ladd Field still brings a lot of business. But the large group of Russian men and officers stationed there left when the war was over.

In the evening I have several callers: (1) Mr. McGrath again about the fish-potato soup project, of which I know nothing, (2) a young man who thinks he wants to go to Russia (I hope I talked him out of it, because he is in no way prepared), and (3) Mr. Leach from Circle Hot Springs. Mr. Leach is strongly of the opinion that settlement in Alaska should be more grouped rather than in scattered farms as favored by the granting of tracts in the sectionized framework. Early to bed.

July 17: In Fairbanks

In the morning Iver and I wrap soil samples for shipment to Washington. The moist ones we shall need to take to Palmer for further drying. I have a rather long conference with Mr. Gasser, State Commissioner of Agriculture, who was for a long time Professor of Agriculture and Director of the Agricultural Experiment Station in Alaska. Since he is well thought of by the farmers and by other members of our party I am anxious to speak with him. Some points of the discussion may be summarized as follows:

1. Careful farm budget analyses would be of great value. Better figures are needed on production costs of alternative enterprises. He stresses the problem of seasonal labor with potatoes and vegetables and the stabilizing influence of dairying and poultry production.

2. He favors closer settlement, approaching the rural village. He would have it as compact as possible on account of sanitation facilities, schools, electric power, etc. He favors the program of the ARRC 1/ for this reason.

3. The farm cooperative in Fairbanks was run badly for awhile. He is not at all enthusiastic about the fish-potato soup proposition involving Mr. "Z." The board of the

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1/ Alaska Rural Rehabilitation Corporation (in the Matanuska Valley).

July 17: In Fairbanks

In the morning Iver and I drop soil samples for analysis to Mechlenburg. The point once we shall need to take to Palmer for further drying. I have a rather long conference with Dr. Dasen, State Commissioner of Agriculture, who was for a long time Professor of Agriculture and Director of the Agricultural Experiment Station in Alaska. Since he is well thought of by the farmers and by other members of our party I am anxious to speak with him. Some points of the discussion may be summarized as follows:

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3. The farm cooperative in Fairbanks was run badly for awhile. He is not at all enthusiastic about the fish-potato soup proposition involving Mr. "X." The board of the

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1/ Alaska Rural Rehabilitation Corporation (in the Matanuska Valley).

Farm Coop in Fairbanks and the Chamber of Commerce had turned it down. It seems that the Territorial Government agreed to furnish part of the funds for Mr. "Z's" visit to Fairbanks, if the remaining cost were raised locally. But a few took it up, apparently raised the funds for Mr. "Z's" trip, and they may start (or have started, it is not clear) another farmer association. Some time ago Mr. Gasser started a garden club; then the club later took up marketing. For five years things went well - sold over $50,000 worth. The following year (last year?) they handled $30,000. This was handled by the Extension Service. Then came the idea of a Coop, and farmers worked directly with the Army - not through Oldroyd, Extension Director as well as Station Director.

But the farmers badly need a central root cellar, that would cost around $20,000. Who should finance it? (McGrath and Palmer[1/] indicated earlier to me that they could get money for it through loans made to GI members of their new association.) (Gasser lets me know that he knows McGrath has been over to the hotel to see me!)

4. Water is generally available on farms in the Tanana valley proper, according to Gasser; it is usually at 20 feet but they can't always get it the first time. Very deep

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1/ Palmer was formerly manager of the Coop but was not rehired and now has a position passing on agricultural loans (and perhaps others) to GI's.

water is likely to be highly mineralized. In deep wells, through permafrost, the wells are likely to freeze, even in summer. The problem of well water is much greater in the hill land, back of the valley margin.

There is some danger now with shallow wells and sewage disposal (most use cess pools) in the same layer. He strongly emphasizes the need of work on sewage disposal. Although he places much emphasis on this point,, he knows of no definite cases of disease from the local water supply.

5. According to Gasser, some individuals in the Land Office favor rural zoning, but the idea will likely be resisted unless it is carefully explained.

6. Mr. Gasser feels deeply that probably any agricultural research program set up by our Agricultural Research Administration should be separate from the University. Although firm in his viewpoint, he does not seem at all dogmatic on the question.

Dr. Aamodt and Mr. Orr come in by bus from Circle in the late afternoon and arrangements are completed for the party to go to Palmer by various routes.

July 18: Fairbanks to McKinley Park Station

Up early, pack, and get ready to go south on the railroad. We travel very light and check most of our stuff to be dropped off at Matanuska from the regular train. Just as I am about to leave I have a wire from Moscow asking permission to get out a Russian edition of The soils that support us. I wire approval.

We are going with Sessions, who needs to get statements signed by all section hands on the railroad that they do not belong to a union that asserts the right to strike against the Government (that is, the Alaska Railroad). He has his wife with him to help. Ellis, Nygard, and I ride in the back seat of a Pontiac equipped with proper lights and special rubber-tired wheels, with flanges, to run on the railroad. At the last minute we discover the car has no proper spade, but Iver is able to buy one. And we are off at 9:15 a.m.

Just after we pass the freight yards and the University, I realize I first should have wired Macmillan about the book before replying. Maybe they'll be sore.1/ As we go along I take several kodachromes and a few black-and-white pictures. After a very short distance we see little cleared land from

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1/ I am afraid they were, but they approved.

July 14: Fairbanks to McKinley Park Station

Up early, pack, and get ready to go south on the railroad. We travel very light and check most of our stuff to be dropped off at Nenana from the regular train. Just as I am about to leave I have a wire from Moscow asking permission to get out a Russian edition of The soils that support us. I wire approval.

We are going with Seatons, who need to get statements signed by all section hands on the railroad that they do not belong to a union that asserts the right to strike against the Government (that is, the Alaska Railroad). He has his wife with him to help. Millie, Bygard, and I ride in the back seat of a Pontiac equipped with proper lights and special rubber-tired wheels, with flanges, to run on the railroad. At the last minute we discover the car has no proper spade, but Iver is able to buy one. And we are off at 9:15 a.m.

Just after we pass the freight yards and the University, I realize I first should have wired Macmillan about the book before replying. Maybe they'll be sore.[1] As we go along I take several kodachromes and a few black-and-white pictures. After a very short distance we see little cleared land from

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[1] I am afraid they were, but they approved.

the railroad. Near Cache there is a fair area of fine sandy loam on a terrace with white and black spruce, larch, willow, dwarf birch, and so on. This appears to be good soil suitable for farming. (See KA VII.2)

We stop for a few minutes about 1/4 mile west of Standard and look at an area said to be Chernozem (!) by Benzin at the College. (He insisted that there were several areas of Chernozem in Alaska, including some in the Aleutian Islands!) The soil is about midway between Half-Bog and Wiesenboden with a good stand of blue top grass. In haste, we take samples of soil and grass. The slope of the terrace is about 1%. This area of some 20 acres was probably cleared long ago, although it may possibly be natural grassland. (See KA VII.3)

Sample No. 21

A_1	0-4"	Dark-brown, highly organic.
A_{11}	4-8"	Brownish-black, well decomposed muck or mucky silt loam.
G	8-18"	Dark gray silt loam, mottled with medium brown and yellowish-brown.

Near Dunbar there is some good Fairbanks very fine sandy loam but not so much as I had expected from tales of the good land there. Two miles beyond Dunbar is some good Tanana (on a terrace) well drained enough for farming. Thus it is quite possible to have a small farm community in the vicinity of Dunbar.

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KA VII.2 July 18, 1946
A few miles south of Cache. Landscape of good soil on terrace (probably Tanana). White and black spruce, larch, willow, dwarf birch, and some blue top (grass) in foreground.

KA VII.3 July 18, 1946
1/4 mile south of Standard. Wiesenboden-Half-Bog soil with dense cover of blue top. Site of sample No. 21.

Around Berg the land is quite low and poorly drained, although not really swampy. I note that water for the section house is hauled in.

In the cut just north of the Nenana crossing Artimesia frigida is growing on the steep bank. A little way south of Nenana is a large wet area - a complex of old river bars and wet alluvial soil - with large spots of sedges and grasses that could be used for hay or pasture. I see more larch in the woods than formerly.

We stop at Clear. Near the section house is a small greenhouse with tomatoes, peppers, parsley, lettuce, and cucumbers. It is heated by a furnace sunk in a pit beneath. It has been used for 10 years between April or May and October. The operator buys his plants from Sellar in Fairbanks and doesn't himself know the varieties.

There is also a little garden on young gravelly sandy loam Brown Forest soil, developed on a natural levee. The surface soil is underlain by gravel and the garden must be irrigated. Uncleared areas have mostly small birch and aspen. The yard has a lot of foxtail grass. In the smoother places the solum is loamy fine sand, with some suggestion of the A_2 and B_2 of Podzol, underlain by gravel that resembles glacial outwash.

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We stop at Olaer. Near the section house is a small greenhouse with tomatoes, peppers, parsley, lettuce, and cucumbers. It is heated by a furnace sunk in a pit beneath. It has been used for 10 years between April or May and October. The operator buys his plants from Sellar in Fairbanks and doesn't himself know the varieties.

There is also a little garden on young gravelly sandy loam Brown Forest soil, developed on a natural levee. The surface soil is unfertain by gravel and the garden must be irrigated. Uncleared areas have mostly small birch and aspen. The yard has a lot of foxtail grass. In the smoother places the soils is loamy fine sand, with some suggestion of the Ag and Bg of Podzol, unfertain by gravel that resembles glacial outwash.

KA VII.4 July 18, 1946
At Clear. Garden on excessively drained gravelly sandy loam young Brown Forest soil, with some suggestion of Podzol, on a narrow natural levee. Irrigated.

KA VII.5 July 18, 1946
At Healey. Looking up the Healy River. Note tilted lignite beds and typical Alaska river bed.

We have lunch in a work train diner and then need to wait for a freight train to pass north. I try to straighten my back out on a long bench without success. At 1:30 p.m. we are off again.

I see several places with dry soil on old levees underlain by gravel and rubble. Five miles below Browne I take a kodachrome of a fine sandy loam soil on a terrace with a cobbly substratum. At Ferry there is one house and a garden.

A little way north of Lignite I see 7 horses grazing. Near Lignite the Nenana River cuts into tilted beds that contain lignite. It looks like the Fort Union formation of the Northern Great Plains. The higher benches and the first bottom are gravelly and cobbly. These beds can be seen nicely at Healy, looking up the Healy River (KA VII.5).

About 4:00 p.m. we come into Healy - a division point on the railroad. We wait for a work train for a few minutes and then hurry on to McKinley Park, which we reach at 7:15 p.m. We pass by some pretty streams and hills but no soil of agricultural interest.

We stay at the McKinley Park Hotel. It is large, very nicely appointed, and has an excellent library on Alaska.

We make arrangements to take the bus tomorrow to and from Camp Eielson, some 80 miles or so west of this station. I hope it will be a nice day to see the mountain - home of the sun to the Indians (Mt. Denali).

Conformal Conic Projection.
Parallels 55° and 65° Scale 1:1000,000

July 10: McKinley Park Station to Camp Wilson and return

We leave on the bus about 8:30 a.m., along with several tourists. Although the bus driver says he will stop wherever we wish and wait for us, I see we shall be exceedingly unpopular if we hurry very long in a place. Trying to do satisfactory work in a framework of scheduled transportation is not satisfactory. Unfortunately the morning is cloudy and rainy.

About 3 miles west of McKinley Park station, on a gravelly terrace at about 3000', we take a sample of soil and vegetation. The area is nearly treeless except for a few small black spruce. There is a ground cover of dwarf birch, stunted blueberry, crowberry, moss, lichens, cetar, etc.

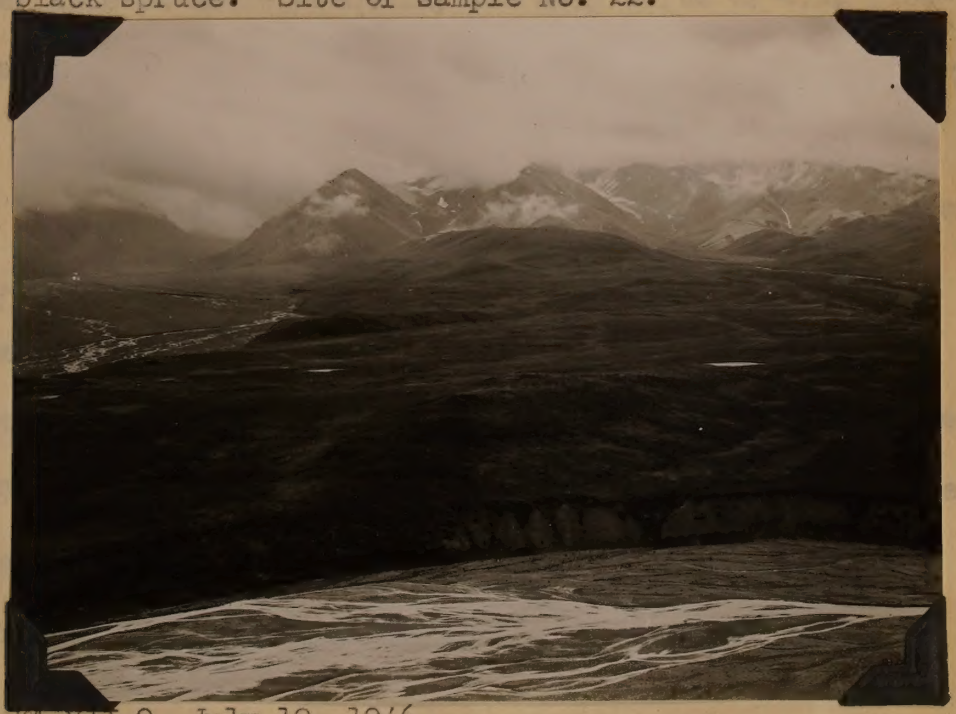
Sample No. 22 (See KA VII-6)

A_{00}	4-2½	Brown moss and living roots.
A_0	2-0	Weak brown peaty surface.
A_1	0-½	Dark brown humus soil - not sampled.
0	½-3½	Highly mottled gray and brown silt loam.
0	3½-15 +	Light yellowish-brown, slightly mottled with gray and brown, gravelly, sandy, clayey drift - possibly outwash.

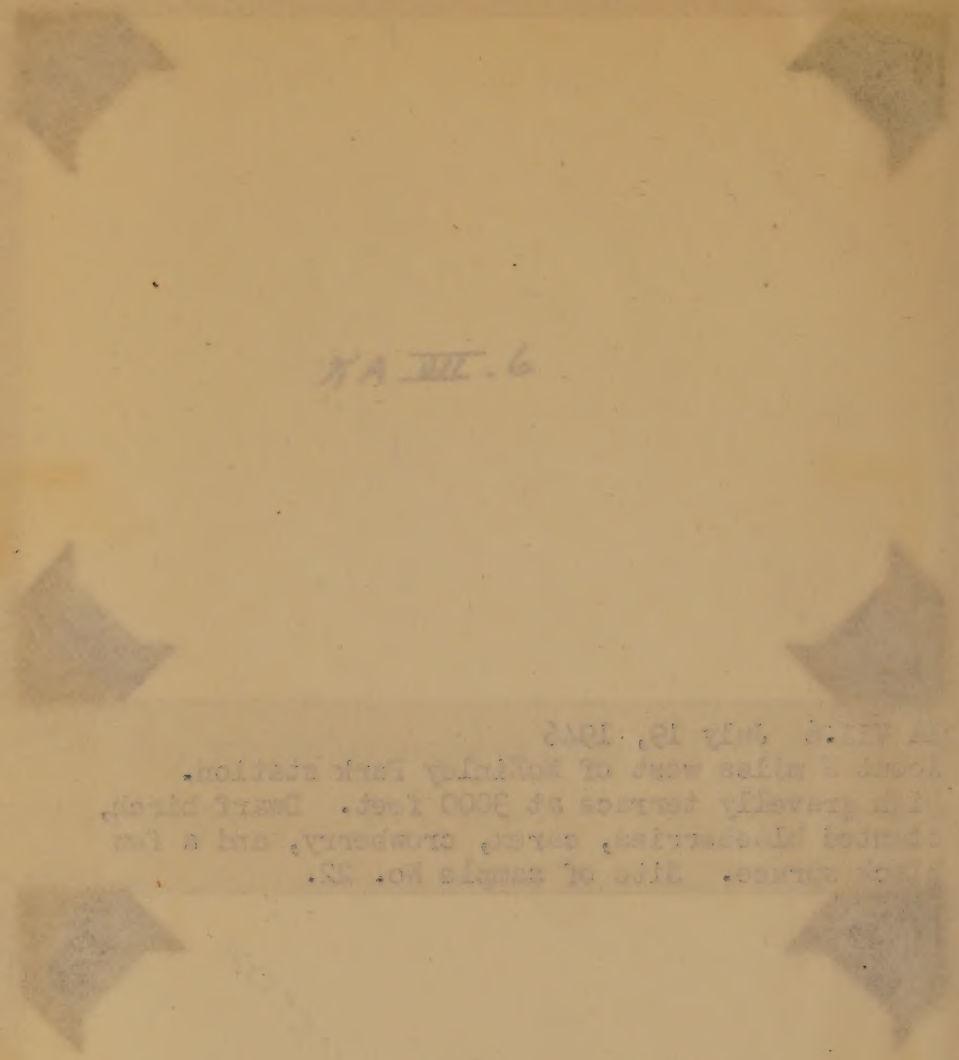
Frost is deep.

Above the timber line there is a continuous ground cover, but little grass. There is a lot of dwarf birch. The vegetation is much heavier in the drain-ways, suggesting water

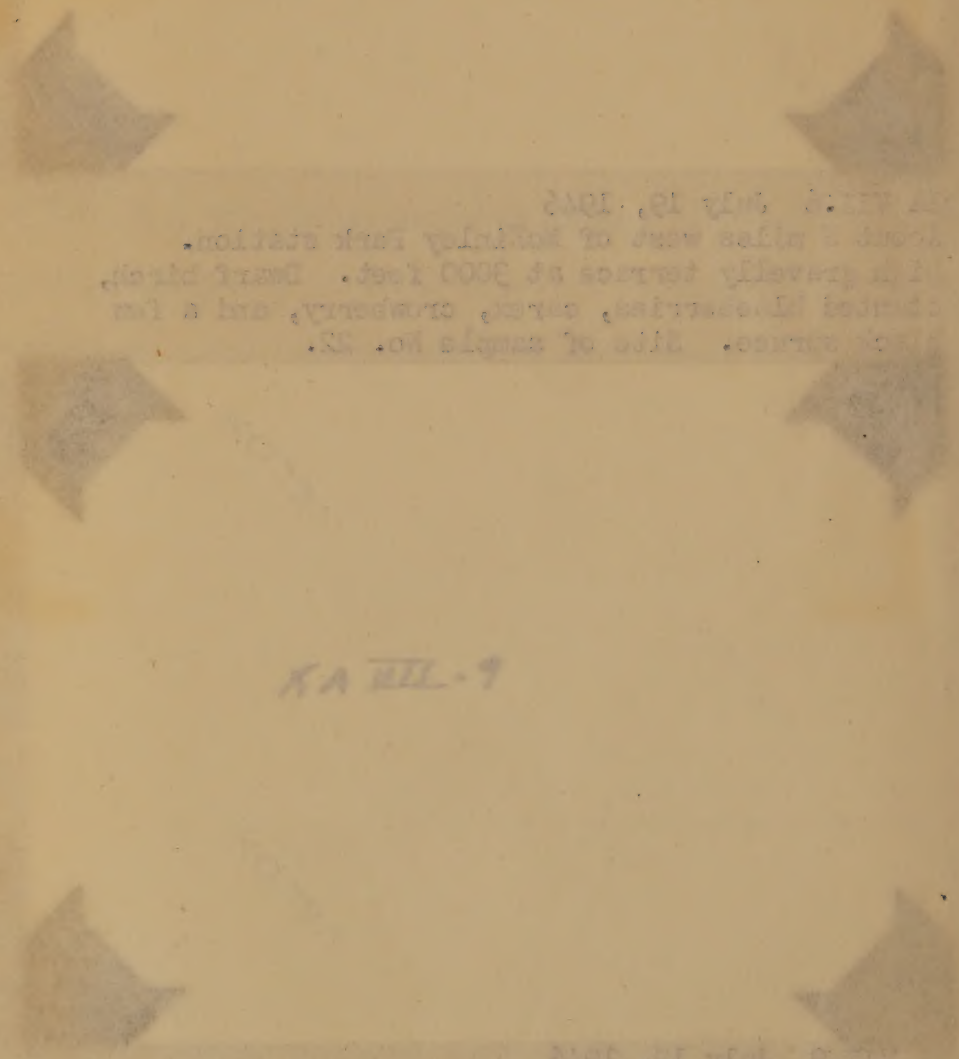
KA VII.6 July 19, 1946
About 8 miles west of McKinley Park station. High gravelly terrace at 3000 feet. Dwarf birch, stunted blueberries, carex, crowberry, and a few black spruce. Site of sample No. 22.



KA VII.9 July 19, 1946
Polychrome Pass, McKinley Park. Well above timber line.



KA III-6



KA III-9

as a limiting factor as well as heat.

At about 19 miles out, near the timber line, there is a fair proportion of grass - in some places as much as 50 percent.

Near the crossing of the Sanctuary River good grass is mixed with the other plants in the first bottom.

It is still cloudy and wet. We stop at a little ranger cabin in a grove of white spruce at the foot slopes of Sable Mountain. There is some grass and many sorts of wild flowers and arctic shrubs. I take kodachromes of twinflowers and other sorts. All along the road, except for the highest passes, is the brilliant fireweed. Even higher, above the timber line on Sable Mountain, are many sorts of wild flowers and patches of good grass, especially along narrow bottoms of the little streams.

I take photographs at Polychrome Pass, above the timber line, but conditions are very bad - rain and fog. Here there are many characteristic arctic ponds in the Arctic Mountain Meadow soil, along with a few outcrops of ryholite. At 3900' we examine this soil hurriedly in the rain. There is some grass and many wild flowers, besides the dwarf arctic shrubs.

KA VII.7 July 19, 1946
Polychrome Pass, McKinley Park. Well above timber line. (Another view)

IA VII.7 July 19, 1946
Polygonatum Foss, Wellsley Park. Well above
timber line. (Another view)

A_1	0-6"	Medium brown, finely granular, very fine sandy loam.
A_3	6-12"	Brown, transitional.
C	12 +	Yellowish, rocky, disintegrated rhyolite.

Now we cross the Toklat River - a swift stream loaded with brownish-gray glacial flour - in a wide gravelly and cobbly, highly braided bed.

Along Highway Pass I see many spots of beautiful Alpine Meadow with grass (carex, mostly) and wild flowers, rather than predominantly dwarf shrubs characteristic of the Tundra. At 1:35 p.m. we arrive at Camp Eielson in a heavy rain. I notice a small fern-like plant, called dryas, much used by grazing wild sheep.

In the lunch room I try to dry out a bit and get warm. It rains hard. We have a good lunch and sit awhile. But the rain keeps coming. The clouds are low and we can't get even a glimpse of Mt. McKinley. (I'm glad I saw it from the Red Army plane a year ago - even though far, far away. I point the camera at the Mountain and get a view of the first foot hills from Camp Eielson (See KA VII.11). This shows the good arctic mountain cover, which is nearly continuous to the snow line. There is less grass there than 20 miles east. The ranger, Mr. Booth, says that the permafrost is down only a-bout 2 feet here.

.KA VII.11 July 19, 1946
Camp Eielson. View looking toward Mt. McKinley in heavy rain. Good Arctic Mountain Meadow.

.KA VII.12 July 19, 1946
3 miles west of Camp Eielson. Arctic Mountain Meadow. Dense cover of dryas, carex, dwarf blueberry, moss, etc. Site of sample No. 23.

Since there is no hope for clear weather we start back at 3:00 p.m.

About 3 miles east of Camp Eielson we take a sample of this Arctic Mountain Meadow soil (in heavy rain). With the soil we take a sample of the dryas forage plant. The ranger is very interested because he thinks the wild sheep are failing to reproduce properly for some reason.

The soil is developed on a slope of about 8% from mixed local alluvium and colluvium containing rhyolite. The dense cover includes dryas, carex, dwarf blueberry, moss, etc., and many wild flowers.

Sample No. 23 (See KA VII.12)

A_0	2-0	Dusky brown fibrous organic mat and living roots.
A_1	0-4"	Dark brown to weak brown silt loam, finely granular, with many fine roots.
B_1	4-10"	Dark yellowish-brown silt loam, mellow, and easily friable to soft granular. Some fine roots.
B_2	10-24"	Dark yellowish-brown heavy silt loam with darker and lighter streaks. Easily friable to imperfect granular. Some fine roots.
C	24 - +	Weak brown to brownish-gray gravelly loam. Easily dug.

I take kodachromes. We get back in the bus quite thoroughly wet. The passengers have been reasonably patient;

but one says that anyone who would go out in this pouring rain to get little bags full of dirt must be crazy. Quite likely!

A few miles further on we see 2 bull caribou grazing on the Arctic Mountain Meadow. I take a kodachrome but the animals are far away and it is raining. Still further on I see a wild (Dall) sheep and an eagle.

We stop briefly in the bottom along the Sanctuary, a typical glacial stream, to take a surface sample of the Alluvial soil and a sample of blue top grass. 1/

Sample No. 24 (KA VIII.11)

Surface 7" - Brown silt loam high in organic matter.

Despite the hard rain, I get pictures of the terrace.

On the east side of the Sanctuary River I see some stony glacial till and much outwash with a few spots of weakly developed, shallow Podzol.

We stop briefly at a little Park Museum where we see a good relief model of the Park, sheep heads, and other curios. Mr. E. H. Booth, of the National Park Service, located here is anxious to add some soil profiles.

We are back at the hotel about 7:30 - very wet. In the evening Mr. Pearson, Senior Officer of the Park, shows us a movie taken by a party, including himself, which climbed

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1/ Actually Mr. Ellis took most of the vetetation samples. He was our grazer.

KA VIII.1 July 19, 1946
Junction of road west of McKinley Park with Sanctuary River. Blue top, fireweed, and spruce on Alluvial soil. Site of sample No. 24.

KA VIII.2 July 19, 1946
Sanctuary River terrace.

both peaks of Mt. McKinley in 1932. He remembers Sterling Hendricks as a member of a recent party that climbed the mountain.

We are also shown a colored movie of wild life in the Park that is the best of its kind I've ever seen. There are excellent close-action shots of wild sheep, grizzly bears, wolves, foxes, and other animals.

Although it rained all day, we got the necessary soil descriptions, samples, and pictures. Yet I'm disappointed not to have had a clear day to see the high mountains; and I can't help resenting a little having to do our scientific work so hurriedly under bad conditions when there is apparently plenty of money for splendid services for tourists and the like.

To bed very tired and with a roaring back.

July 20: McKinley Park station to Curry

While it still rains gently, we leave McKinley Park station about 8:30 a.m. Cuts along the track for a few miles south of McKinley Park show stony glacial till, often with some outwash on top and country rock in deep cuts. I take several kodachromes, including one looking up the Jack River. I see very little grass, except just along the road side.

A mile or so south of Cantwell we stopped in an area of low hills with "C" slopes, made up of stony till and cobbly and gravelly outwash. The surface brown peaty A_0 is underlain by rich brown very fine sandy loam, mellow, and with soft granular structure. The solum is about 18" deep. We have lunch near Cantwell in a work train diner.

Just north of Broad Pass is a large undulating cobbly and stony outwash plain, covered with low shrubs, willows, and dwarf birch. Section hands say that permafrost comes at 2". At least the telegraph wires are still mostly on tripods rather than single poles. These tripods are used in practically all northern and central Alaska, except for well drained gravel.

In some of these places Sessions has a little trouble getting the section hands to sign the statement that they do not belong to a union that asserts the right to strike against the Government. They don't understand the language

of the statement and I'm afraid his explanations make it worse. I help him now and then.

At Broad Pass on a lower terrace, I see Bog and Half-Bog soils with a thin stand of spruce and willow. The substratum is gravelly with silty and fine sand layers.

Going from Broad Pass to Colorado we are soon on a high, choppy, gravelly terrace with a weak Podzol - a fairly brown B_1 and an A_2 about $\frac{1}{2}$" thick.

Near Hurricane Gulch, about $3\frac{1}{2}$ miles north of Hurricane, we sample a Podzol developed on what appears to be a kame or esker. (Profle: KA VIII.4; cut in kame or esker: KA VIII.5) The profile is taken on the ridge top of a nice hogback. The cover consists of spruce, blueberry, cloudberry (a rubus), cranberry, spirea, moss, etc. Where disturbed there is rather heavy blue top. We sample soil and blue top.

Sample No. 25

A_0	3-0	Brown fibrous root mass.
A_1	-	Very thin - not sampled.
A_2	0-2"	(varies from $\frac{1}{4}$" to 4") Brownish gray (with lavender tinge) platy, ashy, fine sandy loam.
B_2	2-8"	(varies from 6" to 10") Dark reddish-brown orterde, slightly cemented.
B_3	8-14"	(varies) Bright, moderate brown gravelly sandy loam, slightly cemented.
C	14 +	Loose fine gravel and coarse gravel from mixed rocks, generally dark.

KA VIII.4 July 20, 1946
Near Hurricane Gulch. Podzol profile
(Sample No. 25)

KA VIII.5 July 20, 1946
Near Hurricane Gulch. Cut in esker or kame near
sit of sample No. 25.

KA VIII.6 July 20, 1946
Near Hurricane Gulch. Cut through Ground-Water Podzol with strong B_2 horizon. Near site of sample No. 25.

On this same cut one sees a well-developed ortstein in an old Ground-Water Podzol (See KA VIII.6).

As we travel on I see fairly good grass along the railroad right-of-way and even back in the woods where there has been much disturbance. We are definitely slipping down from the Alaska Range and out of Central Alaska.

At Chalitna we find good Ground-Water Podzol on low sandy terraces. At the section house is a fair garden.

At Canyon there is a little unheated greenhouse, cold frames, and small gardens - all in rather poor shape, except for some fair peas and strawberries. I try a radish: it is terribly strong.

The forest over Canyon is taller and contains a larger proportion of deciduous trees than any we've seen since Fairbanks. There is quite a bit of grass on the wooded slopes. A small general farm, with cattle would be a distinct possibility here. A little further south I take a kodachrome of a 30 to 40% colluvial slope covered with blue top and fireweeds - a fine pasture area not in use.

We reach Curry about 6:00 p.m. As I register, the manager of this railroad hotel expresses great interest in our work and wants to discuss the possibilities of a farm for the hotel on a smooth area of terrace across the track. I tell him I shall be glad if we might get a spade (ours is locked in the

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We reach Curry about 6:00 p.m. As I register, the manager of this railroad hotel expresses great interest in our work and wants to discuss the possibilities of a farm for the hotel on a smooth area of terrace across the track. I tell him I shall be glad if we might get a spade (ours is locked in the

speeder) and go out to look at the land. He hesitates but says we will in the morning. At the mention of "spade" his interest cools somewhat.

We have a long wait for dinner on account of an excursion train coming in, so I take a stroll about the grounds. Directly back of the hotel is the Susitna River (flowing south) over which a suspension bridge leads to a path up the high cliffs to the west. If one climbs on top, some 3 miles, it is said that a fine view may be had of Mt. McKinley on clear days. But it is still cloudy.

Near the hotel there are some little vegetable gardens with beets (partly gone to seed), onions, broccoli, snap beans, strawberries (good), potatoes (good), leaf lettuce (fair), radishes (fair), carrots (fair), and cabbage (poor), and a few tomatoes and cucumbers under glass. Also I see a few fair beds of flowers, and some very nice ferns, collected locally, 2 to 3 feet high. The garden soil is a dark brown loam, on a terrace, of course. The clipped portion of the lawn would be quite good except that it is terribly infested with dandelions and plantain.

Now we have definitely crossed the Alaska Range into a different ecological zone.

Dinner, a little whiskey and much aspirin, and then to bed.

July 21

Up early for breakfast and a look at the soil near the hotel with the manager. He gets us a spade, but says he is too busy to go out in the grass (which he obviously is not!).

Directly across from the hotel and station is a fair-sized tract, nearly all cleared, of complex river terrace. It is covered with a rank growth of blue top and fireweed 3 to 6 feet high with some very tall (up to 8 feet) wild parsnips, ferns, etc. We take a sample of surface soil and blue stem where it is 4 feet tall. In the more moist places it is still taller.

Sample No. 26 (See KA VIII.7 and VIII.8)

A_p (about 0-7" Rich brown, mellow fine sandy loam, with many roots.

Loose cobbles below about 1 foot.

The soil is a Podzol.

We leave Curry at 9:25. Our driver, Mr. Sessions, decides now that he is in a hurry.

We stop briefly at Talkeetna - a fair-sized village and headquarters for mining. The village stands on a relatively young sandy river terrace with some low well-drained ridges. There is only a suggestion of the Podzol morphology. In the village are several gardens and a few cows. This is by far the largest village since Fairbanks. Potatoes look good.

July 21

KA VIII.7 July 21, 1946
At Curry. Blue top and fireweed on soil developed on complex terrace. Site of sample No. 26.

.KA VIII.8 July 21, 1946
At Curry. Blue top and fireweed on soil developed on complex terrace. Site of sample No. 26. (Another view)

Some buckwheat is grown. I take some kodachromes to show the blue and yellow houses.

Going south of Talkeetna the railway runs over a smooth, low, imperfectly drained terrace with a rather good mixed forest. I see evidences of beavers on both sides of Talkeetna. We see a few cabins and a clearing just below Talkeetna. There are many peat swamps, some of which have been burned and now have grass and sedges. The terrace remnants, as seen in cuts, are gravelly or cobbly fine sand.

Just north of Sunshine is a higher terrace, and beyond very wet swamps. A little way further we see choppy gravelly terraces covered with white birch and aspen while swamps between are spruce. In some of the low places are ponds. Near Montana the terrace is smoother, with a 2 to 3 foot surface of fine sandy material having the solum of a Ground-Water Podzol.

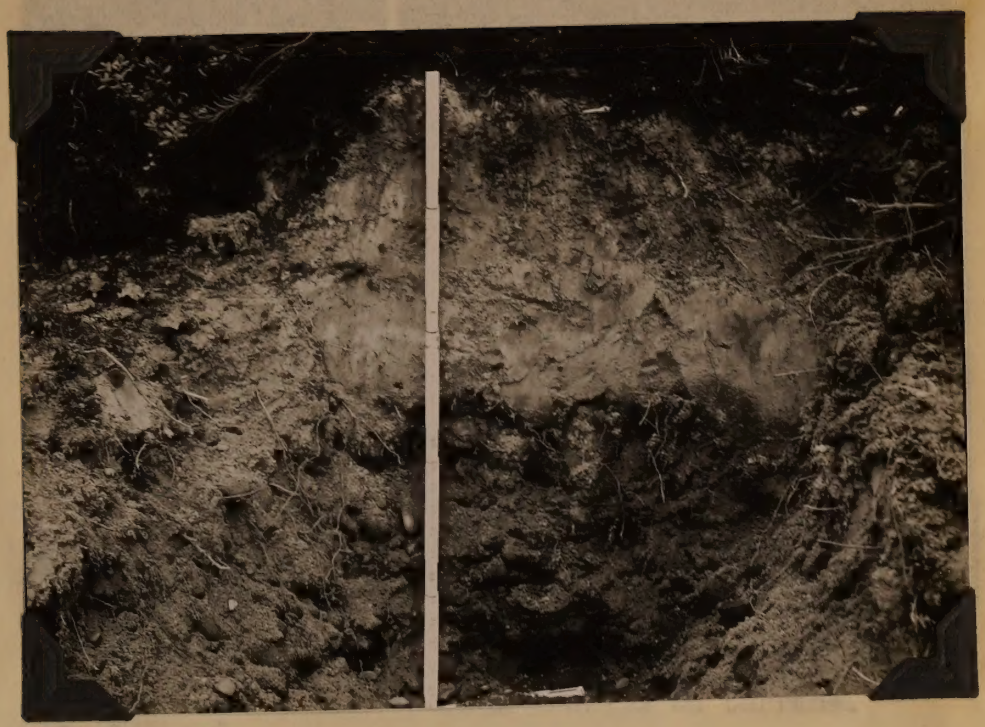
We examine the soil in the woods where the slope is about 1%. White birch is dominant, along with willow and aspen. The ground cover includes blueberry, cranberry, dwarf dogwood, ledum. moss, etc.

A_0	2-0	Mosses and root mat.
A_1	0-½"	Very dark gray fine sandy loam, rich in humus.
A_2	½-2½" (varies)	Light brownish-gray loamy fine sand, with brown stains, Platy.
B_2	2½-6"	Brown fine sandy loam (orterde), granular, and a few very small concretions.
B_3	6-14"	Transitional, brownish-yellow loamy fine sand, stained with brown streaks.
G	14-18"	Gray loamy fine sand with some stains.
C	18 +	Grayish gravelly sand.

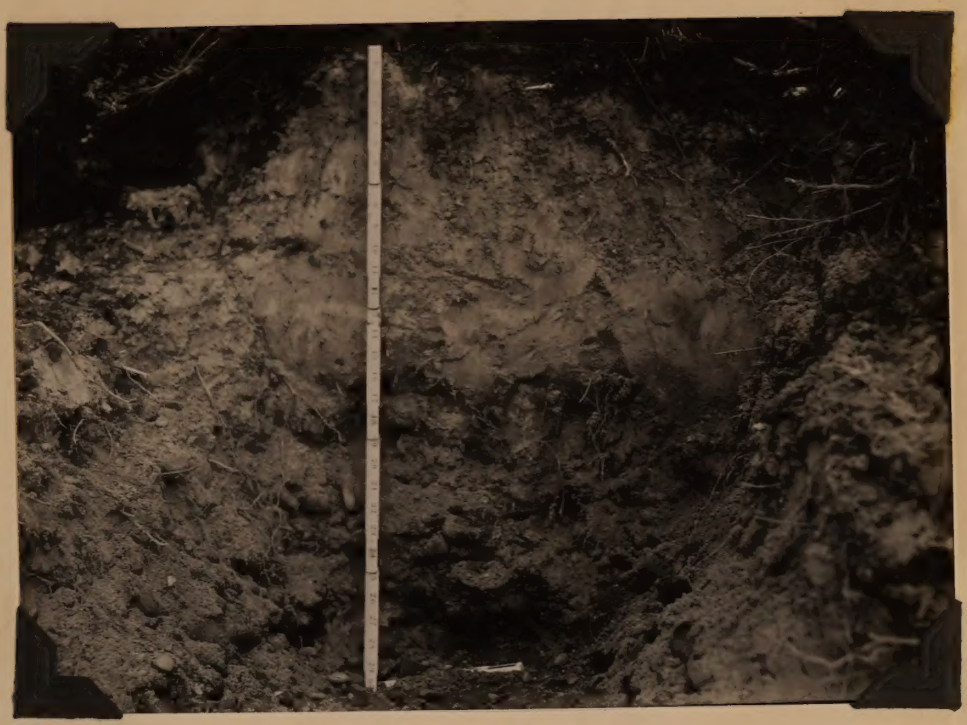
This would be a good Ground-Water Podzol in northern Michigan. The mosquitoes are simply terrible here.

A mile or so south we take pictures of a very similar soil on the edge of a borrow pit. The site is a little drier and there are some small spruce among the vegetation.

We saw gardens at Caswell on this soil - obviously poor due to low soil fertility except where fertilized. The people in the railroad section house are trying very hard to raise vegetables, a lawn, and flowers. It is a great contrast to most of those we've seen. There is a little greenhouse, heated with a wood stove, and covered with glass cloth. Tomatoes, cucumbers, peppers, and lettuce in it look good.



KA VIII.9 July 21 , 1946
South of Talkeetna. Podzol profile on terrace



KA VIII.10 July 21, 1946
South of Talkeetna. Podzol profile on terrace.
(Duplicate)

Out of doors, rhubarb, cabbage, potatoes, carrots, and peas seem fair to good. Beets are no good. Strawberries are very good. The garden needs more fertilizer. There are also some nice flower beds and a good lawn on this Podzol soil (which takes a really green thumb!).

As we go south there are somewhat more swamps. We see a cow moose and a bull moose. I try kodachromes but I'm afraid they will be no good.

Somewhat similar soil seems to continue to Willow and beyond. There was no time to examine a small greenhouse and garden at Willow - but they looked poor.

Our driver is now in a great rush, nor does he know for sure whether the track ahead is clear !! Since the station houses are closed (today is Sunday) he hurries on directly to Matanuska - which we found under water because of floods on the Knik River. It seems that each winter the glacier pushes out into a valley and causes a lake to form back of the ice dam; then in the summer the glacier finally melts back enough to release the water. One might call it a sort of self-dumping lake. The flood had recently come to Matanuska station.

Sessions has a key that fits the lock on the baggage room so we get our bags, which were checked out of Fairbanks,

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Sessions has a key that fits the lock on the baggage room so we get our bags, which were checked out of Fairbanks,

and call Palmer for a cab. Session takes us down toward Palmer, beyond the flood. We pile out all our baggage and then need to carry it down a steep railway embankment and up a steep highway fill to meet the taxi.

Fortunately he comes at once and we are in Palmer at 2:45 p.m. Some of the others have come before us and have arranged for rooms in the hotel belonging to the Matanuska Valley Farmers Cooperative. And we eat dinner in their restaurant - a little late.

In the evening we sit around and exchange experiences awhile before going to bed. Unfortunately, Olaf will need to take a lot of time to make arrangements for transportation.

U. S. COAST AND GEODETIC SURVEY, WASHINGTON, D. C.
MARCH, 1945

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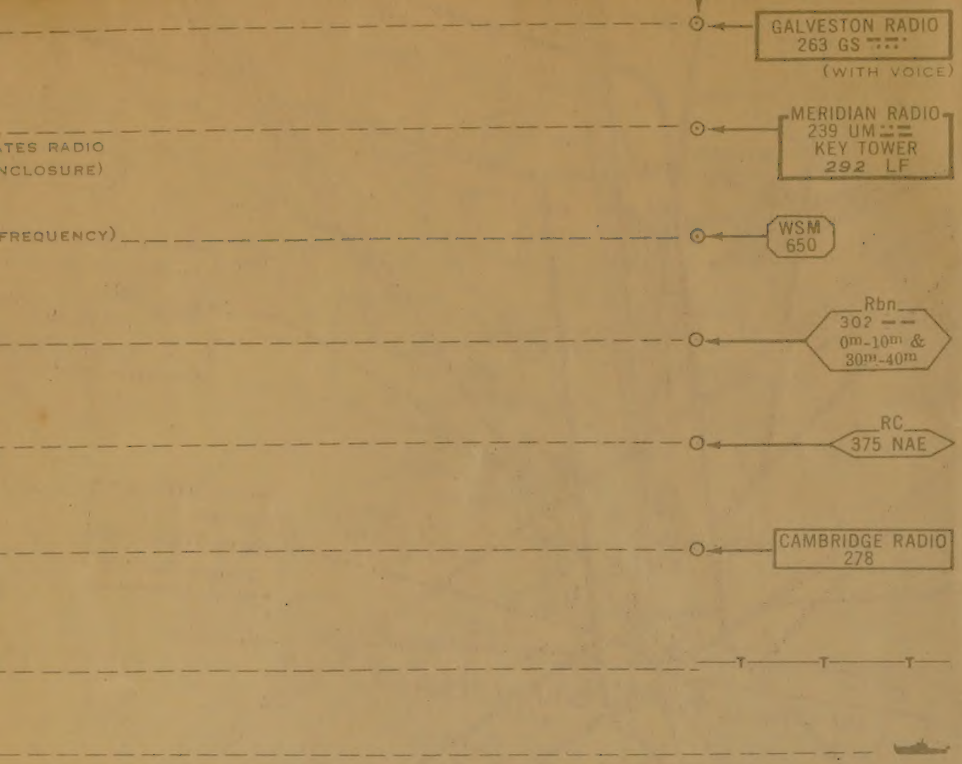

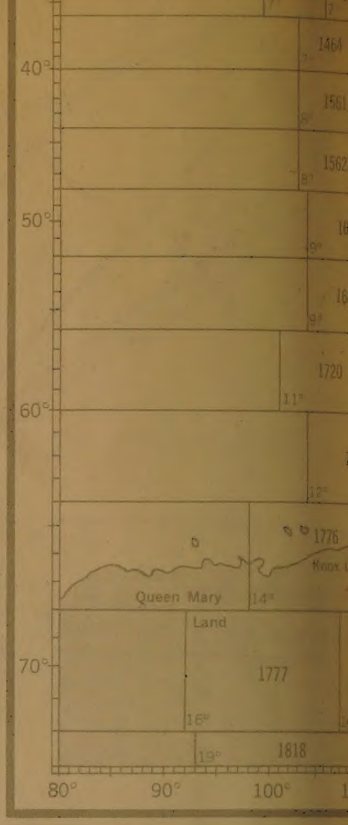

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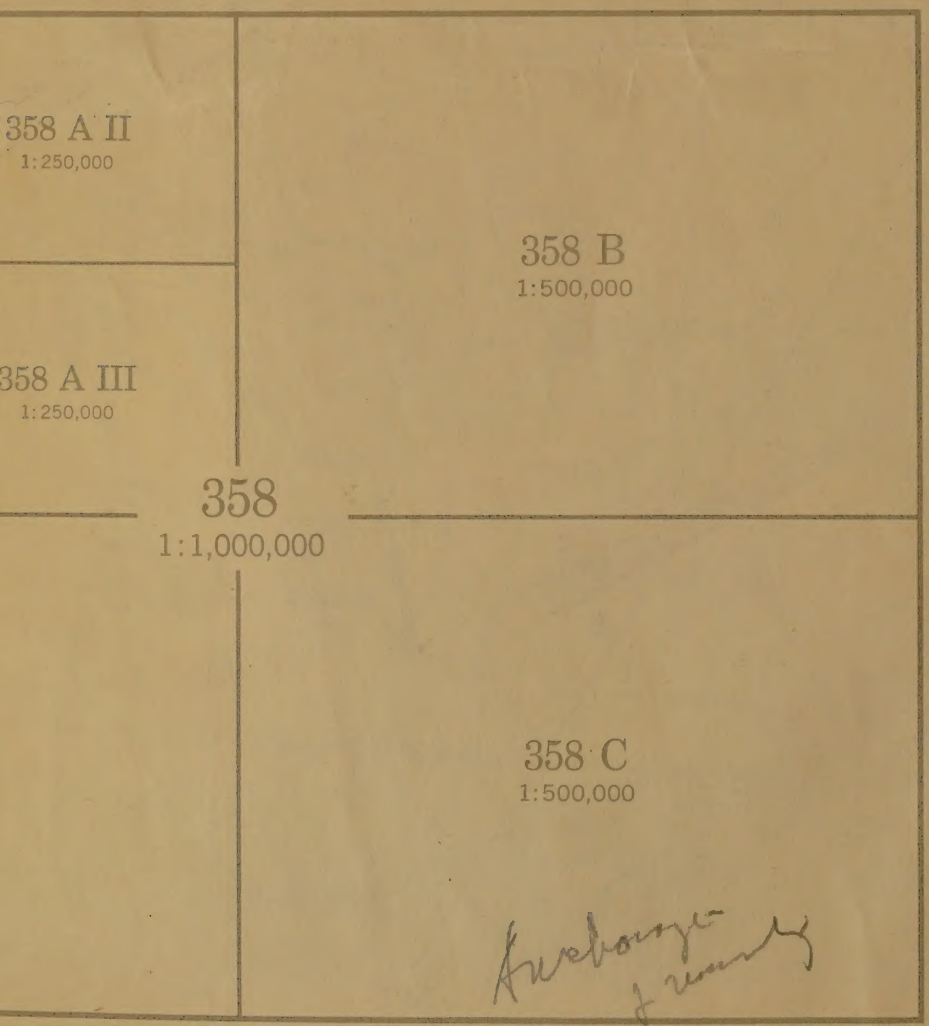

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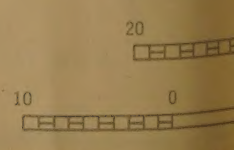

July 22: In and near Palmer

This morning I first call on Don Irwin, Director of the ARRC. He says there are about 250 farm families in the Matanuska Valley community of whom about 140 are ARRC clients. Population is strengthening rather rapidly. During the past year the ARRC has sold about 20 tracts of government land. Besides, several homesteads were taken up near the Seward Meridian.

He says the soil north of Wasilla is "thin," 1/ but would furnish abundant range for livestock. (Winter feed?)

He agrees that earlier clearing methods using deeply set bulldozer blades, which removed the surface layers (A_0 and A_1) with the roots and stumps, were bad. Now

---

1/ This word "thin", and its opposite "deep," are, perhaps the most common terms applied to soils in this region. They almost always refer to the total depth of fine material, especially very fine sandy loam, over gravel, regardless of the depth of A_0, A_1, or the solum. Often one hears of soils "6 feet deep." Now, of course, the solum is rarely more than 18" to 24" deep in Alaska. The expression means that the loamy material, soil and soil material, are underlain at 6' by gravel or stones. On the other hand, a "thin" soil "only 6 inches deep" has part of the solum, which is 12 to 18 inches deep, developed from the gravel. Many of the soils are developed from rather young deposits of alluvium or wind-blown materials, added in layers, and containing partially decomposed wood and other organic matter so that the distinction between the solum and the parent material often is not sharp.

July 22: In and over Palmer

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scarifying teeth are often used rather than blades. In sodded areas with old stumps, the blades do not go deeply but slide over the turf.

There is some burning of brush and trees in place, after a period of dry weather. In days of good winds, farmers burn, after having cut the timber. Of course, freezing and thawing in winter loosen the soil and roots. In winter the blade is used on willow and other brush and the scarifying teeth in summer.

Although the Canadians are said to clear land a little east of Alaska for $8 to $40 per acre, the cost of clearing runs close to $100 per acre around Palmer. New settlers were originally charged $36 per acre for their first 15 acres and $72 per acre for additional acres. But now pay scales for bulldozer operators are much higher - more than twice what they were in 1940-41. Already the ARRC has written off some of the cost.

When a settler-client moves away from a place the ARRC resells for $5 plus $36 for the first 15 cleared acres and $5 + $72 for the additional cleared acres. (Presumably $5 per acre is charged for the uncleared land.) They charge ½ the cost of houses and barns. Other out-buildings, like chicken houses and well houses, are set at about $200 eac h,

with broader houses at $50. These items are added to get the total appraisal. (I couldn't help but shudder at the ultimate inequality of opportunity on account of soil variation. But what to do, if people have cleared poor land?)

The ARRC charges no interest and loans some money so that men will not need to seek work elsewhere. They look toward a stable population.

Other, private land is now selling much higher.

About 14 colonists have paid up entirely.

At first there were 208 colony families having units of only 40 acres, with a few of 60 to 80. These were too small and, as the population went down, they were consolidated. It is now felt that a dairy farm should have at least 120 acres.

Although nearly everyone uses a tractor, Irwin feels the cash outlay is too great and that many would do better with horses. (Added later: I doubt this unless cheaper winter feed can be grown.)

The Matanuska Valley Farmers Coop began in 1937. In 1939 the farmers took over the management with loans from the ARRC and the FSA on a long-term basis. They had many troubles, and still have many, but as time goes on they are getting on a sounder basis. Mr. Harris, former principal of the school, is now manager.

There are now 52 families left of the original 208. Many of the original colonists were not farmers to begin with but mechanics, bakers, butchers, etc. Some were in poor health - anemic, tuberculosis, heart disease, etc. Some families were chosen by social workers in the States so they might get rid of them - certain radicals, for example.

I asked Irwin for copies of the maps made by the party the Soil Conservation Service had in the Valley several years ago. I explain that I was informed in Washington that he had a set we could use. He says he has none and never did have one. He knew Rockie when he was in the Valley and was promised the maps, but was unable to get a set. The only one he knows about is a set Anderson of FSA has in Anchorage, without text. Although he did now know the details, Irwin says that there was some dispute within the SCS over the interpretation of the maps - possibly over the relative importance of volcanic ash and wind-blown silt! (This sounds preposterous, but who knows?)

I then call on Mr. R. N. Kessler, the district agent (equivalent of county agent). I find he is much interested in soil fertility and has been making soil tests ("quick tests") with equipment he bought himself after the Extension Service refused to buy it. He is leaving July 31, next, to

go into business for himself in Anchorage - nursery and landscaping. He feels he had too much "paper" work and not enough time to work at the real job with the farmers. He is a fine appearing young man, recently out of the Army after about 4 years' service, mostly as a plane navigator in England.

I ask about record books. He gives farmers the standard FSA record book (Form FSA-195. Rev. 9/5/45). Nothing has been done on farm budget analysis. They have only the vaguest idea of production costs.

I ask about the Soil Conservation Service maps made in the Valley. He knows there are such but has never been able to get copies.

He gives the names of several farmers to visit to get a good idea of farm practices in the Valley: Sherrad, Johanson, Kircher, McAllister, Anderson, Wilson, Newville, Thompson, Thuma, Leibing, and Blum.

We talk some about fertilizers. All good farmers use fertilizers on potatoes and vegetables at least. Practically all mix their own! They use mostly 45% superphosphate, muriate of potash, sodium nitrate, ammonium sulphate, and ammonium nitrate. It is hard to get K_2SO_4. Farmers generally use something like a 5-10-10 at about 300 to 500 lbs. for potatoes and some vegetables. The agent,

Mr. Kessler, believes that this is too high in K and possibly too low in N for most conditions. His tests show fairly high K content but very low P. Also the Spurway test shows the soils low in Mn. Mg is usually low, but he gets occasional high tests. One farmer got good results from boron. Tests also show low Fe and SO_4.

Experience shows, he says, that fertilizers are absolutely necessary in the Valley. Although little lime is used, and most others do not emphasize it, Kessler believes it should be used. He has pH tests as low as 4.5 in fields.

I look over his bulletins and see my leaflet showing conversion factors for fertilizer rates from pounds to volume. He says it is in great demand. We make arrangements to go out and see some farms directly after lunch.

We leave at 1 p.m. - Kessler, Nygard, and I. He stresses the violence of the northeast winds, which blow across the broad bottoms of the Matanuska River and over the Valley. He believes that the land around Palmer, and west for several miles from the river is still getting additions of this wind-blown glacial flow.

We visit the McAllister farm a little way west and north of Palmer.

He has 65 cleared acres and has 15 milk cows, 2 heifers, and 1 bull. He does not use any woods pasture because of the

danger to the udders of the cows. He also has some trouble with larkspur - which grows abundantly and poisons stock - and this is another reason why he doesn't use brush pasture.

His well is 60 feet deep and he appears to have plenty of good water. He uses a milking machine.

This farmer is very interested in seeing an agricultural research program. He obviously reads a great deal. He says that if he goes to the Matanuska Experiment Station, they tell him what they have read in the same books he has read. "I can read the books," he says, "what I want are the actual results of experiments and other research under Alaska conditions. This is what we need here. It is too costly for us individual farmers to do our own experimenting, especially with potatoes and cattle; furthermore, we don't have the proper training and equipment."

He is much concerned about his pasture. We walk over it. The grass, chiefly Kentucky blue grass, is about the most spotted I've ever seen. The grass cover is continuous but has pronounced spots of darker green, much more thrifty, grass. McAllister wonders whether these spots indicate need of the soil for K, for N, for minor elements, or some combination. Organic matter should be added to the list. I try to get pictures. (See KA VIII.11)

I decide to try sampling this pasture for analysis of both soil and grass.

Sample No. 26. These were taken in the pasture field. It is billowy, suggesting wind deposition. The individual slopes are 3 to 10%, but short. At the site of sampling the slope is about 4 to 5%. The soil is a grayish-brown very fine sandy loam.

Sample No. 26_{p1} - Soil under dark green grass (0-7").

" " 26_{p2} - Soil under light green grass (0-7").

At site (1):

$A_{p-1.1}$	0-2"	Dark brownish-gray very fine sandy loam, matted with grass roots.
$A_{p-1.2}$	2-7"	Brownish-gray, loose very fine sandy loam with some evidence of platy structure and A_2 of Podzol.
A_3	7-18"	Grayish-brown light very fine sandy loam, mellow, loose, finely granular. Grass roots to 12". Contains remains of old tree roots.
C (or) G(?)	18-+	Brown, mottled with dark-gray and light-brown, loamy very fine sand, slightly compact.

This profile is under the "good" spot of vigorous dark green grass; under the poor grass (site 2) the soil is quite similar but may be lighter in color in the solum.

I walk over a new brome grass meadow with the grass about 5" high. He used 40 tons of manure on a field I estimate to contain around 3 acres. I take some kodachromes to

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C (or) B(?) 12-+		Brown, mottled with dark-gray and light-brown, loamy very fine sand, slightly compact.

This profile is under the "good" spot of vigorous dark green grass; under the poor grass (site 2) the soil is quite similar but may be lighter in color in the solum.

I walk over a new brome grass meadow with the grass about 9" high. He used 40 tons of manure on a field I estimate to contain around 3 acres. I take more holeborings to

KA VIII.11 July 22, 1946
McAllister farm near Palmer. Very spotted pasture. Site of sample No. 26.

KA VIII.12 July 22, 1946
McAllister farm near Palmer. Peas and oats for hay in foreground.

show where an old windrow was burned at right and the peas and oats are exceptionally good as compared to rather poor growth on the left. I wonder why this very good effect of the ash? Is it lime? or K? Organic matter in soil scooped up with roots? Sulphur? Boron? Or what? Probably it is some combination of effects, not just one single thing.

For a view of this farm, taken from the oats-pea field see KA VIII.12. During 8 years, he has had one crop of potatoes and 7 of oats and peas on this field in the foreground. At first there were big windrows of stumps and roots, but he is gradually working the material down by burning and concentrating until he has only a few piles left, like the one shown. He knows that too much surface soil was pushed into the windrows by the bulldozer blade.

I am poorly impressed with most of the oats and peas I've seen, used for hay and silage. A good legume hay, like red clover or Siberian red clover, is badly needed. But hay is hard to cure because of the light summer rains and seed of the Siberian red clover is hard to come by. Little white clover in pastures is about all I see in the way of a first-rate forage legume. Something needs to be done, if possible, for a rotation legume that serves the purpose of red clover in northern Maine.

McAllister impresses me as an able manager - well qualified to handle a larger business. But apparently he is doing well, although he has only a little garden. I promise that Mr. Ellis will see him about his hay and rations for his cows.

We drive back toward the river and look at the fine sandy bluffs. Note KA IX.1 - a picture of the glacial flour blowing up out of the wide bottom of the Matanuska River. There is only a little real haze: the apparent haze is dust, even though a red filter was used. KA IX.2 is a close view of the adjacent high bluff. Note how the finer material has been blown out, leaving fine sand, medium sand, and some fine gravel. (The land had been disturbed here.)

These bluffs along the river resemble dunes in most ways and high alluvial levees in others. The material has likely blown up out of the river during periods of very high winds sweeping down from the northeast. As one goes away from the river the material becomes finer and rapidly thins (over the gravel). The way the river bends as it approaches Palmer, the wind gets a sweep for a long distance along the tangent to the inside curve. (Should this material be called "loess" ?) Some very thin, light gray bands may be volcanic ash. I don't know.

.KA IX.1 July 22, 1946
A few miles north of Palmer. View of Matanuska River with very fine sand blowing out of bed. (Not much real haze, but dust.)

.KA IX.2 July 22, 1946
A few miles north of Palmer. High bank near Matanuska River. Medium and coarse sand has been left here by the wind.

We drive to the Johanson farm, not far north and east of Palmer. He came to the Valley in 1912, long before the Colony.

Near the house we see nice cabbages, potatoes, carrots, and onions in the garden. We then walk out to a potato field of Arctic Seedlings that looks nice, although the vines are a little small. He uses about 250 lbs. to the acre of a 5-10-10 in continuous bands on either side. These were planted June 3 and he expects 10 tons per acre. Last year he sold his potatoes for seed in the Yakima valley of Washington. These potatoes are deeply ridged (about 10") and the rows widely spaced (42"). (See KA IX.3)

The land here is quite billowy. The surface is a dark gray very fine sandy loam with lighter colored soil at 12 inches. Below 19 inches the soil is mottled with gray and brown. The low places between the mounds are somewhat swampy, especially in the spring before the frost leaves. But these soils appear to be <u>much</u> better drained after clearing than before.

Farmers, Johanson says, are cleaning up the old windrows in several ways. He is pushing the big stuff into an old gravel pit.

He suggests to cut timber with the ax and use the logs and poles for firewood. Within a year the stumps can be

.KA IX.3 July 22, 1946
Johanson farm, northwest of Palmer. Arctic Seedling potatoes on good soil of Matanuska Valley showing characteristic billowy relief.

.KA IX.4 July 22, 1946
Johanson farm, northwest of Palmer. Field cultivated for 10 years, now in peas and oats. Looks across site of sample No. 27 (cultivated), and into woods at site of sample No. 27.

knocked over with the bulldozer. These may be burned as soon as they are dry - two months or more, depending on the weather. When stumps are gathered together cleanly with the bulldozer too much surface soil is taken. He estimates a cost for clearing of $100 per acre.

Johanson has built a barn and is just starting a small dairy herd with 1 cow, 1 calf, and 1 heifer. He uses woods pasture 1/ for two months or so, but agrees it is not good for mature cows. He uses oats and peas for hay. 1945 - an unusually wet season - was the only year he had significant trouble making hay. Spots in the field of oats are yellowish and some plants are nearly dead. Many oat leaves have yellow streaks in the leaves that suggest a nutrient deficiency. He says that the yellowing only occurs in spots and the plants usually recover later. I am sure some oat plants will not recover: they are nearly dead now.

He has a small greenhouse, heated with a sheet iron stove in a pit. The north side of the greenhouse is made of boards and tarpaper. It is built like a lean-to, sloping to the south side. The roof and 3 sides are made of glass cloth. The plants in front are grown in beds on the ground

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1/ Even in fairly heavy stands of trees, if the surface is trampled or disturbed, blue top comes in rapidly.

while he has a nearly waist-high bench along the north side. He first starts his celery plants in it and after they are gone uses it for tomatoes and cucumbers, which look nice now.

I notice rather good-sized fields (about 1 acre each) of lettuce, cauliflower and endive - all of which look thrifty.

Across the road from the house I look at the soil in the woods, which Johanson says was like other land prior to clearing. The land is somewhat billowy and appears to be a little swampy as we walk over it. We sample on an imperfectly drained slope of about 1%. There is a good stand of white birch and spruce with a rather heavy cover of blue top and delphinium (indicating some disturbance, I believe), small birch, wild currants, etc. We sample soil and blue top grass.

Sample No. 27 1/

A_{00}	3½-2"	Mat of relatively fresh leaves.
A_0	2-0	Brown mat of organic matter and living roots.
A_1	-	Very thin - not sampled
A_2	0-4"	Light grayish-brown, mottled with brown (organic matter?) fluffy very fine sandy loam.
G or C	4-20" +	Medium grayish-brown, mottled with light gray and brown, light very fine sandy loam. Slightly compact in place but very easily friable to soft crumb.

1/ Possibly Bodenberg soil of SCS survey (?)

We also take a surface sample from an adjoining small field cultivated for 10 years, now in peas and oats only 3" high, although healthy in appearance. This field has had no manure or fertilizer.

A_p - (0-6" or 7") Grayish-brown very fine sandy loam[1/] When chunks are broken, one sees mottling as in G-C of virgin soil.

The lower soil is like that in the woods except slightly more compact.

(See KA IX.4 for a view of the sites of the above samples.)

One is impressed by the truly enormous change brought about in such a soil by clearing and cultivation. The volume weight is very greatly increased, the percentage of living roots in and on the soil is enormously reduced, and the insulation from the sun eliminated. Certainly the genetic processes must be fundamentally altered.

We look at 2 small fields of rather good celery on a relatively wet associate of the soil described above. There is a dark brown plowed surface soil underlain by a dark gray, mottled with brown and gray, very fine sandy loam (G-C). Gravel is found here at about 36". Some of the celery plants are rather small and pale - apparently too wet.

It is now late and I realize my knife is gone. I find it near the spot where the last sample was taken.

1/ Some of the samples called very fine sandy loam in this area may analyze silt loams.

At first Mr. Johanson is rather cautious with us - definitely skeptical of visitors, especially from Washington. But as he sees us work getting samples and taking notes, with the mosquitoes terribly bad, he warms up in good shape. He impresses me as a fine man and a good farmer.

Both these farms are well cared for, yet weeds are bad, especially lamb's quarter. On the whole, weeds are easily one of the first problems in this valley. They grow high and thickly along the roads, in the fence rows, and quite generally everywhere on some farms.

Fortunately, Mr. Edgar was able to get some film for me in Anchorage today.

This day is now over, except for a late dinner and to bed.

July 23: In and near Palmer

In the morning I visit Mr. Sherrad's farm with the agricultural agent, Mr. Kessler, and several others - in fact, with too many others. He produces mainly vegetables but has 4 sheep, 2 goats, and 2 calves. Mr. Sherrad is very energetic and full of ideas about most everything. He is a leader in the Coop. He has reflected about how the material near the river was laid down and apparently discussed it with Rockie (some mixture!). He is very anxious about an area of land across the river and a road to it. 1/ Although very friendly and warm-hearted, it is hard to keep him on any subject for long, and especially on one he knows about first hand.

His farm borders the Matanuska River and gets the full force of the strong northeast winds. Wisely, he has left a strip of forest on the sandy bluffs between his house and fields and the 120-foot drop to the river. At the bluff there are several feet of fine sandy material, then several feet of gravel, and then compact, gray, stony glacial till, rich in clay. The surface fine material is stratified and contains organic layers as well as layers of small pebbles and coarse sand grains. One is puzzled to decide between alluvial action and wind. The winds are so strong that large

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1/ I heard later that he owns it.

July 27: In and near Lafayette

In the morning I visit Mr. Oberrad's farm with the agricultural agent, Mr. Hessler, and several others - in fact, with too many others. He produces mainly vegetables but has 4 sheep, 2 goats, and 2 calves. Mr. Oberrad is very energetic and full of ideas about most everything. He is a leader in the Coop. He has reflected about how the material near the river was laid down and apparently discussed it with Doolie (some mixture!). He is very anxious about an area of land across the river and a road to it. 1/ Although very friendly and warm-hearted, it is hard to keep him on any subject for long, and especially on one he knows about first hand.

His farm borders the Tippecanoe River and gets the full force of the strong northeast winds. Wisely, he has left a strip of forest on the sandy bluffs between his house and fields and the 120-foot drop to the river. At the bluff there are several feet of fine sandy material, then several feet of gravel, and then compact, gray, stony glacial till, rich in clay. The surface fine material is stratified and contains organic layers as well as layers of small pebbles and coarse sand grains. One is puzzled to decide between alluvial action and wind. The winds are so strong that large

1/ I heard later that he owns it.

KA IX.5 July 23, 1946
Sherrad's farm, north of Palmer. Cabbage on field of sandy soil near river. Poor row in center without fertilizer.

KA IX.6 July 23, 1946
Sherrad's farm, north of Palmer. Arctic Wonder potatoes (a selection of Arctic Seedlings), planted May 5.

KA IX.5

KA IX.6

trees are overthrown if the ground is unfrozen. Likely some very coarse material blows up out of the river bed during these powerful winter storms. At least Sherrad says he has seen fair-sized pebbles drop on the surface !

I look at a field of late cabbage on billowy light fine sandy loam near the river, surrounded by wind breaks. He sows the cabbage seed directly in the ground. A part of this field is shown in KA IX.5. The drill clogged so that the row in the foreground had no fertilizer. Oats and peas are used as green manure one year out of two or two years out of three. Even these decompose very slowly - only a little in one year. He uses fertilizer on all his crops but has only a very hazy idea of composition and rate. He says he will get records from the house, but after several unproductive starts, I give up. Likely he bought 45% P_2O_5, muriate of potash, and ammonium sulphate or nitrate from the Coop and mixed to taste!

There is some evident effect of soil blowing, although the problem is neither so general nor so serious as Mr. Sherrad has been told to believe.

He spaces his carrots at 48" (!) for convenience of machine tillage. The part of the field nearest the river has been cleared only two years. It is slightly undulating, with about 3% slope. The native vegetation was cottonwood,

birch, and aspen. The soil is lighter in color and texture and younger in profile than the soil sampled yesterday. We take a sample here.

Sample No. 28

A_p	0-9"	Light grayish-brown, with olive tinge, loamy fine sand. Rather loose. Contains quite a bit of coarse organic matter from stumps and roots.
B (weak)	9-15"	Similar to above but less organic matter and slightly compact.
C	15 - +	Loamy fine sand.

Near the house is a nice large garden of which I take several kodachromes. He says pictures of his house are in many magazine articles about the Colony. There are nice squash, cauliflower, lettuce, and early cabbage. He grows early cabbage, cauliflower, and celery plants in the greenhouse and follows with tomatoes and cucumbers.

In a more distant field, rather billowy, and with a fair amount of sharp, angular medium sand and a few small pebbles, I see some very nice potatoes. These are said to be Arctic Wonders, selected from the Arctic Seedlings (KA IX.6). This upper potato field is undulating with a slope of 1 to 3%. He says, and there is slight evidence, that some washing occurs in the spring before the frost leaves. This problem is apparently not so serious here as

brown, and sugar. The soil is lighter in color and texture and younger in profile than the soil sampled yesterday. We take a sample here.

Sample No. 28

A 0-9" Light grayish-brown, with olive tinge, loamy fine sand. Rather loose. Contains quite a bit of coarse organic matter from stumps and roots.

B (weak) 9-15" Similar to above but less organic matter and slightly compact.

C 15 - + Loamy fine sand.

Near the house is a nice large garden of which I take several indoor views. He says pictures of his house are in many magazine articles about the Ozlonk. There are nice squash, cauliflower, lettuce, and early cabbage. He grows early cabbage, cauliflower, and celery plants in the greenhouse and follows with tomatoes and cucumbers.

In a more distant field, rather hilly, and with a fair amount of sharp, angular medium sand and a few small pebbles, I see some very nice potatoes. These are said to be Arctic Wonders, selected from the Arctic Seedlings (MA IX.6). This upper potato field is undulating with a slope of 1 to 3%. He says, and there is slight evidence, that sure washing occurs in the spring before the frost leaves. This problem is apparently not so serious here as

KA IX.7 July 23, 1946
Sherrad's farm, north of Palmer. Arctic Wonder potatoes (a selection of Arctic Seedlings), planted May 5. (With red filter)

KA ZX.7

on the sloping soil near Fairbanks which has everfrozen subsoil. Apparently there is no permafrost in this valley, except under the deep peat.

He has some Siberian wheat for poultry and oats to thresh.

We now visit the Merle Anderson farm just a little ways south of Palmer. He is away but Mrs. Anderson shows us about a little. This is primarily a dairy farm. They have 30 cattle, including 16 milk cows, 1 bull, and heifers and dry stock. They have 32 acres of cleared land, mostly pasture and oats, peas, and vetch for hay and silage. There is a new, relatively large barn. They use a milking machine.

We go out in the pasture (despite a rough-looking bull). This was cleared 10 years ago and has been for 7 years in pasture. A light (?) application of fertilizer was made 4 years ago. (See KA-IX.8).

The field is very gently undulating, about ½ to 2% slope. Drainage is fair. An adjoining woods has cottonwood, spruce, and white birch. This soil is much like that in the village of Palmer.

KA IX.8 July 23, 1946
Merl Anderson farm, just south of Palmer.
Pasture cleared over 10 years ago. Site of sample No. 29.

KA XX.8

Sample No. 29

A_p	0-7"	Brown very fine sandy loam. Good turf. The soil is firm and easily friable to soft crumb.
B-G	7-14"	Mottled, brown and gray, compact but easily friable, very fine sandy loam. Many grass roots.
C-G	14-20" +	Mottled and streaked light very fine sandy loam. Somewhat lighter in color than above.

Oats, peas, and vetch are grown for the silo. Some oats are grown for grain. Manure is used mostly on the fields when ensilage is grown, although some is used on the pasture.

Not much emphasis on the garden, and the greenhouse is used only irregularly.

At 1:00 p.m. all our party, except Magruder, who has not reached Palmer yet, go to a meeting in the school house, attended by Mr. Harris, present manager of the Coop, Don Irwin, Mr. Balloun, Superintendent of the Matanuska Experiment Station, Mr. Finiman, agronomist at this station, Mr. Kessler, district agricultural agent, Mr. Rossmussen, a farmer, and Dr. Haehn, the local physician. These gentlemen suggest important problems in the Valley:

Mr. Harris

1. Problem of storage for all sorts of vegetables. He says keeping quality depends upon fertilizer. Lettuce

fertilized with abundant nitrogen keeps poorly, for example, andexcess nitrogen gives celery that wilts quickly.

2. Soil classification, for settlement and especially for recommending specific crops and practices needed. This should be accompanied by soil analyses and tests (I think he means both plots and "quick" tests).

3. Need better crop rotations for the specific soil types with legumes. Having a problem to establish alfalfa on many soils.

4. Straw, manure, and green manures decompose very slowly. How about mulches and composts? (Irwin suggests that organic matter should be disced in, partly because soil temperatures are so low beneath the surface.)

Mr. Irwin

First he passed out 2 outlines of suggestions, gotten up with the help of the local group for the Territorial Governor. They were obviously hastily prepared. They are vague and not well stated. Several of the recommendations clearly show confusion as to the proper functions of the various Federal agencies, especially the U. S. Department of Agriculture. For example, it is recommended in one of the documents that the Land Office make a soil survey of the Valley - or certain parts of it! (Likely they had in mind some sort of land classification.)

He says that in 1935 there were 275 to 300 acres under cultivation near Palmer and about 8,000 cleared acres by 1946. The ARRC cleared some 432 acres in 1945.

1. He suggests the detailed investigation of several other areas in Alaska. He suggests, for example, the area around McGrath. He sounds over-optimistic to me. Much so.

2. More native grown plants should be used - flowers, roses, bluebérries, etc. Need locally grown seed.

3. Precedence in settlement should be given areas near existing settlements.

4. Need more irrigation.

5. Irwin and Kessler do not believe that the village pattern of occupancy would be agreeable to farmers.

6. Suggests testing of Alaska-grown seed potatoes in (U.S.) State experiment stations for virus diseases.

7. Need more breeding work with grains, legumes, vegetables, etc.

8. Emphasized the need of exchanges of materials and experience with Russians in Siberia.

9. Need nutritional analysis of feeds, grasses, and vegetables, including vitamins.

10. The area should have a specialist on garden vegetables. (Presumably as a sort of assistant district agent?)

11. Need a proper association of varieties of vegetables for (a) summer use, (b) canning, (c) storage in winter, and (d) quick freezing.

12. Badly need soil classification and soil analysis.

Mr. Kessler

1. Land clearing studies as to (a) efficiency, and (b) saving of surface soil.

2. Pot tests on soils to determine fertilizer needs of soils on farms.

3. The whole question of lime need and use.

4. A proper soil laboratory is needed for soil and plant tests.

5. Need field tests of soils.

6. Need a variety of tomatoes that will grow in the field as well as new varieties of other crops.

Mr. Balloun

1. More work needed in poultry husbandry - housing, feeding, and breeding. Now getting eggs of low quality.

2. Soil tillage and prevention of soil blowing.

3. Storage of vegetables, potatoes, hay, and grain.

4. Quick freezing.

5. Harvesting methods of hay and grains. (Hay for example: by hand, 8 man-hours per ton; with loader, 4.6 man-hours per ton.)

11. Need a proper association of varieties of vegetables for (a) summer use, (b) canning, (c) storage in winter, and (d) quick freezing.

12. Badly need soil classification and soil analysis.

Mr. Keeler

1. Land clearing studies as to (a) efficiency, and (b) saving of surface soil.

2. Pot tests on soils to determine fertilizer needs of soils on farms.

3. The whole question of lime need and use.

4. A proper soil laboratory is needed for soil and plant tests.

5. Need field tests of soils.

6. Need a variety of tomatoes that will grow in the field as well as new varieties of other crops.

Mr. Ballou

1. More work needed in poultry husbandry - housing, feeding, and breeding. How setting eggs of low quality.

2. Soil tillage and prevention of soil blowing.

3. Storage of vegetables, potatoes, hay, and grain.

4. Quick freezing.

5. Harvesting methods of hay and grains. (Hay for example: by hand, 8 man-hours per ton; with loader, 4.5 man-hours per ton.)

6. Breeding work with cattle and other farm animals.

7. Feed analyses and uses, especially in relation to vitamins and minerals.

8. Livestock housing, especially to avoid excessive inside moisture.

These are their opinions. We helped them through discussion of principles only. I wonder what the farmers will say when we get their ideas in a later meeting? 1/

Dr. Haehn tells me privately that there is much vitamin deficiency among people in the Valley. He has had cases of beri-beri, scurvy, rickets, etc. Rather than the locally grown vegetables being poor, it may be a matter of poor food selection in the diet, improper cooking, and poor quality of foods shipped in, especially during the long winter months.

After dinner at a reasonable hour, back in the hotel. I talk some with Mr. Kirk Stone - a geographer doing survey work, so-called "land classification," for the Land Office. He is a bright young man - but he knows most too many answers. He says he has maps and text of the elusive SCS survey of the Valley. He says he will loan them to us - but doesn't get them.

Early to bed.

1/ Scheduled meeting with farmers later called off on account of threatened diphtheria epidemic. Too bad!

July 24: Matanuska Glacier and Hitchcock homestead

Up for an early start on the road east of Palmer that leads to the Richardson highway. Kessler, Nygard, and I leave in the rough-riding command "car" about 8 o'clock. About 4 miles out, gravel is within a foot of the surface; and at 6 miles we come into breaks with hilly, gravelly soil. I take several kodachromes of the mountains to the south, across the Matanuska River - an angry, turbulent glacial river.

Most of the land to the Matanuska Glacier is hilly and covered with thin forest, except for a few stream bottoms where it is tall and thick, and the usual dwarf, shrubby ground cover. The front of the glacier is partly covered with fine rock material, but here and there the blue ice peeks through.

Right near the road by Matanuska Glacier is a Civil Aeronautics Station. We drive in and inquire for a way across the river onto the glacier. There is none. The stream is too wide, deep, and swift for even traversing with a boat. Huge boulders growl along over the bottom under the whirl pools. One needs to walk around the river - a hike of many, many miles for which we have neither time nor equipment.

KA IX.9 July 24, 1946
A few miles west of Matanuska Glacier. View of small glacier looking up Monument Creek.

KA IX.10 July 24, 1946
Matanuska Glacier

KA IX.9

KA IX.10

Back of the station is a sharp little mountain that we decide to climb for a better view. The slope is about 75%, and half peat bog! I climb up about 750 or 900 feet and realize how foolish it is: my heart goes like a trip hammer! From the little shelf at this elevation I get some good pictures of the glacier. The shelf here is made up of huge boulders and rock outcrops, full of holes ideal for animal dens, but I see none (animals, that is). It begins to rain, so I start down, while Iver and Kessler go up further. Down again at the station, I'm soaked. One of the young men invites me into his cottage - a very nice one - to sit by the fire while he cooks a roast for dinner. He tells me about the country about and suggests I visit a homestead near Caribou Creek nearby. I shall need to walk part of the way but he says there are nice gardens. It scarcely seems possible in such a country. The man - Hitchcock - had been employed at the CAA station as a carpenter. After many broken promises by CAA to furnish him a cabin for his family, he quit and took up this homestead. Sounds interesting.

The others return and we dirve on a few miles to Sheep Mountain Inn for lunch. We are all now very wet and cold. The proprietor is rather garrulous but a decent sort. His young wife gives us a good lunch, just ahead of two fine

.KA IX.11 July 24, 1946
Matanuska Glacier from Glacier Point

.KA IX.12 July 24, 1946
Matanuska Glacier from Glacier Point
(Another view)

tow-headed, healthy youngsters. He is a licensed guide and tells us stories of the wealthy people he has "hunted " at $50 to $100 per day plus expenses, including Mellon - Secretary of the Treasury under Hoover. His place is in a nice white spruce grove. He has a few horses. His first attempt at a garden is not very good this year.

We return as far as Caribou Creek and take a very poor side road down stream through a heavy forest on the low stream terrace. We bump along for a mile or so and decide to continue on foot. We meet a hunter who tells us that only Mrs. Hitchcock is home but we decide to see the place anyway.

After a good 10-minute walk we come to a partial opening in the spruce forest and up to about 10 vicious looking, barking sled dogs pulling and jumping at their chains. One wonders if any of the chains are well-worn! We walk among them, well out of reach, pretending to ignore them (which is silly) and on to the house. After some knocking, a lady dressed in overalls comes to the door. 1/ We explain our interest and she shows us about. She has a boy about 11 years old with her.

The cabin is a large one, built roughly but expertly of spruce logs. Besides the house, I see a fine root cellar,

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1/ Mrs. Benson Hitchcock, Caribou Creek, Palmer, Alaska.

a greenhouse, and a nice work shop. She explains that her husband makes dog sleds, which he sells for $125 to $165 each. This day he has gone to Anchorage for some oak lumber used in making them.

The plants in the greenhouse look fine. This is started in late March or early April and kept going until the third week of October. Early cabbage, celery, and lettuce plants are started first. After these are moved out tomatoes and cucumbers take over. A few melons are also growing. She has some trouble getting the flowers pollinated, especially the first blossoms. I measure some cucumbers - Chinese long - that are 16" in length ! Bison tomatoes did the best, then Marglobe. She has also Bounty and Mammoth Colossal (page Los Angeles!).

There are several small gardens near the stream on a low, dark-colored, first bottom that overflows following very heavy rains in the watershed of Caribou Creek. (This is a torrent that joins the Matanuska River a mile or two further downstream.)

I see celery (Utah), potatoes (Arctic Seedlings), beets, onions from seed and from sets, cabbage, peas, lettuce, strawberries, radishes, tomatoes, upland cress, and sunflowers (experimental). Most of the crops are excellent and none is poor.

KA X.4 July 24, 1946
Hitchcock farm near Caribou Creek. View of Greenhouse.

A mixed fertilizer of uncertain composition (likely about 5-10-5 or 5-10-10) is added in solution. (This last seems entirely unnecessary work.) This solution is put underneath seed and transplants.

We take a sample of the surface soil from the garden - No. 30.

We go into the house and rest. She picks out of bed another boy about 3 years old. There is one large room that serves as kitchen, dining room, living room, and library (in which there are many good books that have been and are being read). There appears to be one fairly large bedroom, one small one, and a considerable attic. The furniture is partly old and partly hand made -- rough but expertly made and solid. I see a good radio.

Mrs. Hitchcock is a graduate of Oberlin and formerly worked for a Detroit newspaper. She is a lady about 30 - perhaps a little more. Since living in Alaska she has learned to read Russian. I promise to try to get her some Soviet garden bulletins. She teaches the older boy, who speaks perfect English and is unusually alert.

She says they like it very much here. They like to be by themselves (and they certainly are!) and never get lonesome. "Nothing dramatic happens here" she says. "People have Alaska all wrong. It is a good place for quiet

living, and work. We love it. Now we have dogs, and soon we shall get a cow." Then I recall seeing the rifle leaning against the back doorjamb, the bearskins stretched on the shop wall, and the howling dogs. I see another rifle handy in the kitchen.

She says, "You know I came near not letting you in. There is a murderer loose near here - the one who killed the woman in Anchorage the other day. A pause. "But," she went on, "I got a good look at you and decided you were not the type." I feel really puffed up.

It is very comfortable in the cabin and a delight to talk with this intelligent woman. But time runs on and we have far to go.

As we leave - "Don't touch the dogs, they know us, but..." Perfectly useless advice! I wonder again about those chains. After all, there must come a day when they wear out, break, and a dog gets loose.1/

About 2 miles west of Chickaloon we take a sample of the dark gray silty very fine sand out of a fresh river bar. This river is a gray, angry torrent moving with high sharp waves in many places.

1/ Such dogs are really dangerous, even to their own people should they chance to stumble. Like wolves, they are more apt to attack a person, or another dog, who has fallen than one standing.

Apparently much of the mother rock for the glacial flour in the river is phyllite, although quartz-diorite, granite, and other rocks were also seen. This likely accounts, in part, for the dark color of the fine terrace material and the wind-blown very fine sand of the Matanuska Valley.

Nowhere on this trip today have we seen more than a suggestion of true Podzol.

The dark-colored fine soil material, probably wind-blown, characteristic of the Matanuska Valley, begins to appear about 12 miles from Palmer.

Back again for another late dinner. But this has been a good day. Meeting intelligent, self-reliant, warm-hearted people like Mrs. Hitchcock somehow renews one's faith in humanity. We'll get along.

July 25: More farms near Palmer

My first thought this morning: Why did I climb that mountain yesterday?

Again with Kessler and Nygard, I drive west of Palmer and stop at a new farm - of Mr. Carl Mielke from Wisconsin. In a fresh cut by his home I take several pictures of the profile. (KA X.5 : Note the sharp contrast between the fine sandy wind-blown material and the coarse gravel beneath.)

It seems to me that this land is too hilly for clearing. It has sharp billowy relief that may be pitted outwash intensified by unequal wind deposition. He was able to buy the land cheap - only $2.00 per acre - near to Palmer where he can get additional employment. But the small saving in land cost is absolutely nothing to the cost of clearing. Some spots are fairly smooth and he has cleared some of these for truck crops. According to Kessler's tests this garden soil is very acid.

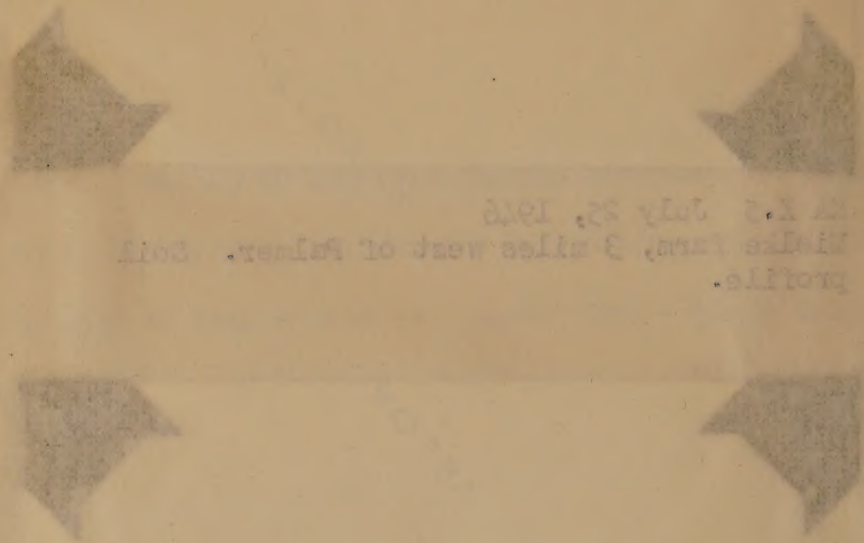
We drive to farm 4 miles west and 1½ miles north of Palmer run by Mr. Kircher and Mr. Minck. We see the latter.

In a plot on excellent brown Alluvial soil by a small stream is the best celery I've seen so far. The seed was planted in the greenhouse April 13 and the plants transplanted out May 15. Much manure has been used and some commercial fertilizer, containing N, P, and K, but he is vague

KA X.5 July 25, 1946
Mielke farm, 3 miles west of Palmer. Soil profile.

KA X.7 July 25, 1946
Mielke farm, 3 miles west of Palmer. Part of garden looking toward house at left and chicken house at right (New farm)

KA X-6



KA X-7

about rate and ratio. One needs only a very small acreage of celery like this for a large income. Flow in the adjacent stream is relatively constant, so the celery has about ideal moisture through subirrigation, without swamping or flooding.

Some livestock are grown, but Mr. Minck is a little vague here also. We look at a field of peas and oats where there are enormous variations in growth, even though the field appears to be nearly level. The crop appears to suffer from both P and N deficiency. The variations suggest unequal manure applications or, perhaps, they are due to poor clearing that destroyed the surface organic matter. The field was broken out in 1936 and has had oats and peas every year except for potatoes 4 years ago. Muriate of potash was used on the potatoes at 175 lbs. per acre. The field was manured once in 1938 or 1939.

We take a sample of soil and crop in this very gently undulating field about 300 yards from the stream. The site is out in the field a little way, where the crop is poor (See KA X.8).

KA X.8 July 25, 1946
Kircher farm 4 miles west and 1½ miles north of Palmer. Poor crop of peas and oats. Site of sample No. 31.

Sample No. 31

A_{p-1}	0-7"	Light grayish-brown light very fine sandy loam, rather low in organic matter for this region.
B	7-12"	Light yellowish-brown light very fine sandy loam, slightly compact but easily friable. Some roots.
C	12-19 +	Yellowish-brown, with olive tinge, loose gravelly coarse sand.

There is some evidence of Podzol morphology.

Another surface soil and a crop sample are taken nearby, closer to the headland, where the crop is good, for comparison of available P and K. This is numbered A_{p-2} (0-7"). This sample appears to contain more organic matter and there is somewhat more mottling in the subsoil.

It is possible that a somewhat "bumpy" field was leveled by clearing with a deeply set bulldozer blade, which would be very bad practice. One is continually impressed with the enormous importance of organic matter in these soils and the need to conduct clearing in a way to save as much as possible.

We drive on west. About 5 miles west of Palmer we see more Podzol development, a gray, mottled A_2 and browner B_2, in a site like sample 31.

Further on we look at a soil profile near Wasilla Lake, developed from about 10" of fine material over stratified sand, gravel, and cobbles. The land has been severely

burned so the A_0 is nearly absent. There is a thin, ashy, fluffy, gray light very fine sandy loam A_2, and a weak B. Back further in the woods, the A2 is more moist and mottled with a good B just above the gravel. This area is nearly flat; I see similar soil with kame-like relief.

We drive on to Wasilla for lunch.

About $5\frac{1}{2}$ miles southwest of Wasilla we examine a Podzol on a smooth, undulating to gently rolling well drained terrace under a forest cover of aspen, white birch, and willow.

A_{00} and A_0	2-0	Brown mat of leaves, roots, and rotten wood.
A_1	-	Very thin.
A_2	0-4"	Fluffy, light brownish-gray loamy very fine sand.
A_3	4-6"	Transitional.
B	6-12"	Yellowish-brown loamy very fine sand. Soft crumb structure. Very little compaction. Some stones.
C	12 +	Yellow loose sand, cobbles, and gravel.

There is a considerable area in this region of soil like this, which I believe to be unsuitable for farming.

We drive on down to a very broad tidal marsh. The land is flat and wet with the watertable essentially at the surface. We sample the soil and sedge vegetation about 3/8 mile from the upland (too wet to go further out now).

Sample No. 32

A_1	0-6"	Mat of sedge roots and silt, brown with blue tinge.
G_1	6-12"	Blue or bluish-gray silt, some roots.
G_2	12 -	As above, with less roots and more intense blue color.

I can't recall ever seeing a soil so blue in color.

Not far southwest is a large barn. Cattle have been raised here partly with sedge hay harvested from this tidal marsh.[1/] I see none now.

We drive back toward Wasilla and then for a way down the road toward Knik. Here there is a large area of gently undulating soil, like the Podzol last described except that the gravel substratum is about 24" down, the A_2 is deeper - about 5 inches - and the B_2 is browner and more highly developed. This is possibly suitable for cultivation under very favorable economic conditions but I should recommend against it now.

We look at a new clearing about 3 or 4 miles southeast of Wasilla. Here the bulldozer blade was used and it took up altogether too much of the organic-rich surface soil (See KA X.10 and KA X.11). Clearing very definitely should not be done this way.

1/ I heard that the owner of the herd, since dead, was persuaded to sell his cattle for meat during one of the shipping tie-ups.

KA X.10 July 25, 1946
3 or 4 miles southeast of Wasilla. Newly cleared field. Too much of the surface organic matter was removed in clearing. (Mr. Kessler, l., Dr. Nygard, r.)

KA X.11 July 25, 1946
2 or 4 miles southeast of Wasilla. General view of newly cleared field where too much surface organic matter has been removed.

The soil is a weak Podzol from wind-blown fine material some 12 to 20 inches deep over gravel.

A_2	0-5"	Grayish-brown very fine sandy loam.
B_2	5-10"	Moderate brown very fine sandy loam. Better oxidized than the soils near Palmer.
B_3	10-13"	Yellowish-brown very fine sandy loam with fine irregular blocky structure, easily friable.
C	13 -	Gravelly material.

We visit the Blum farm on the way back to Palmer. This family has been on the place 2 years. Mr. Blum is away but we talk with Mrs. Blum for awhile and look over the fields rapidly.

I see an excellent field of Arctic Seedling potatoes. A 5-10-5 fertilizer is used rather than a 5-10-10 as most farmers use.

This farm has about 400 hens and 1 cow.

Siberian wheat, grown for chickens, is very spotted indeed, and shows much nitrogen deficiency, except in spots. This spotted condition is even more striking on the peas and oats.

The soil is gently undulating. The forest growth is chiefly white birch, but with more spruce than at the previous place of new clearing.

A_p	0-6"	Grayish-brown very fine sandy loam.
A_3	6-12"	Mottled gray and brown very fine sandy loam.
B_2	12-18"	Brown fine, or very fine, sandy loam.
B_3	18-20"	Yellowish-brown fine sandy loam.
C1/	20 -	Loose yellowish-brown gravelly, cobbly sand.

Some commercial vegetables are grown, including celery and lettuce, not too good. The celery is late - put out only in early July. There is a good, but weedy, home vegetable garden.

Oats, barley, and wheat all look rather poor. These grains were said to be better last year when there was more rain, but I believe the trouble is largely fertility, especially N and P. Where the manure was pushed out over a part of a field the grain is exceedingly good. But most of the grain has short straw, short heads, and some smut. Weeds are very bad, especially lamb's quarter.

On the way into Palmer we pass a large area of good soil near Lake McLeod. The gravel comes at about 30", not counting A_{00} and A_0. The cover is white birch and white spruce of large size.

1/ In uncleared areas this gravelly sand would likely appear to be 30" or more in depth to the casual observer.

(Upon inquiry later I find this land is held privately for speculation. It is a great shame on the Alaskan Government that this should be so. It would be much better for good land, near roads, schools, and markets, to be used before settlers go far distant, as some are sure to do. But with no land tax, speculation of this sort, bad for the community, is encouraged.)

From my conversations with Stone and others I fear homesteaders may be encouraged to take up (at least not discouraged from taking up) land like the Podzols described today southwest of Wasilla. Too bad! After talking with Stone I suspect the accuracy and "reality" of the Land Office "land classification." But I hope they are not too over-optimistic, else settlers who allow themselves to be influenced by their maps may be disillusioned.

July 26: Near Bodenburg and the Willow road

Nygard, Aamodt, Kessler, and I go across the Matanuska River to an area of farm land in the neighborhood of Bodenburg Butte between the Matanuska and Knik. For a few miles the road goes through rather heavy timber growing on shallow, wet, cobbly soil.

We stop at the Folk farm a little ways north of the Butte and near the Matanuska River. This is a considerable farm with 51 head of cattle, mostly heifers. He has only 3 cows now but is enlarging and improving his barn, and building a silo for a large, grade "A" dairy. He has built a tank for saving the liquid manure according to the European custom. There are several fair-sized grain fields and 160 acres of pasture of which 100 acres is open. The farm was cleared between 1936 and 1940.

The fields of wheat and barley near the house are by far the most uniform I've seen. The barley follows potatoes fertilized in the row. The residual effect of the P (and K?) show up strikingly. (See KA X.12 and XI.1)

We take samples of soil and oats from a field of 1 to 2% slope cleared last year, although used as woods pasture previously. The crop is a mixture of oats, peas, and vetch, planted May 21.

Sample No. 32 23

A_p	0-10"	Grayish-brown very fine sandy loam.
$G-B_1$	10-15"	Mottled gray and brown (rubs to brownish-gray) slightly compact very fine sandy loam.
$G-B_2$	15-22"	Like above, but with more brown and less gray.
C	22-27 +	Like above but less compact. There are layers rich in partially decomposed organic matter.

With more cultivation the volume weight of the surface soil will undoubtedly increase.

We walk over to river bank, where this raging Matanuska is cutting seriously into excellent farm land. A large rock outcrop up stream a little way protects the Folk farm from much damage, but the farmer to the south will likely lose his buildings soon unless something is done. A short stone jetty is needed to swing the current back toward the center of the very broad bottom. (The question arose as to whose responsibility this should be: U. S. Army Engineers?)

We walk out through a scrub-brush pasture on rolling, or rather billowy land. There are many raspberries and wild roses. This brush pasture should really be improved by clearing or fenced off from good milk cows. The blue grass pasture just beyond is somewhat over-grazed and shows low fertility. On an average 6% slope we take a

Sample No. 23

A_p	0-10"	Grayish-brown very fine sandy loam.
$C-B_2^1$	10-15"	Mottled gray and brown (rubs to brownish-gray) slightly compact very fine sandy loam.
$C-B_2^2$	15-22"	Like above, but with more brown and less gray.
C	22-27 +	Like above but less compact. There are layers rich in partially decomposed organic matter.

With more cultivation the volume weight of the surface soil will undoubtedly increase.

We walk over to river bank, where this raging batamula is cutting cavernously into excellent farm land. A large rock outcrop up stream a little way protects the folk farm from much damage, but the farmer to the south will likely lose his buildings soon unless something is done. A short stone jetty is needed to swing the current back toward the center of the very broad bottom. (The question arose as to whose responsibility this should be: U. S. Army Engineers?)

We walk out through a scrub-brush pasture on rolling, or rather hilly land. There are many raspberries and wild roses. This brush pasture should really be improved by clearing or fenced off from good milk cows. The blue grass pasture just beyond is somewhat over-grazed and shows low fertility. On an average 6% slope we take a

KA X.12 July 26, 1946
Folk farm north of Bodenburg Butte. Wheat on this farm looks good. (Left to right: Aamodt, Folk, Kessler, Nygard.)

KA X1.1 July 26, 1946
Folk farm north of Bodenburg Butte. Hansen beardless barley. Note residual effects of phosphate (and potash?) fertilizer used in row on potatoes last year.

sample of surface soil and of the blue grass. The grass blades are very short.

Sample No. ~~33~~ 34

A_p 0-7" Fluffy, grayish-brown very fine sandy loam.

The lower soil is like sample No. 32.

We go out into another oat field on smoother land where the crop is badly spotted. The oats were planted May 12. We sample surface soil (0-7") and oats in both good and bad spots. (See KA XI.2)

Sample No. 34-B

A_{p1} - good spot

A_{p2} - good spot

Available P, K, and pH are needed.

We visit the Nelson farm on the south side of the Butte and adjacent to it.

This is a pre-colony farm and he owns a Colony farm. He is just now combining the barns and will build a hay shed. He is also establishing a grade "A" dairy. Now there are 8 cows, 1 bull, 5 heifers, 275 hens, and 200 pullets. In addition to wheat (Marquis and Siberian) for the chickens and oat-and-pea hay, he raises potatoes. He has a rough rotation of 2 crops of small grain between potatoes. (4-6 A of potatoes, 20 A of wheat, and 40 A of oats and oats-and-peas.) In KA XI.3 Siberian wheat is shown in the immediate

KA XI.2 July 26, 1946
Folk farm north of Bodenburg Butte. Taking samples from good spot in oat field. Poor spot in immediate foreground. (Left to right: Aamodt, Folk, Kessler, Nygard, son of Mr. Folk.)

foreground, then Marquis wheat, and the Butte in the background. This is a slightly warmer spot than usual, favoring maturity of the wheat. The wheat is nice and uniform in growth.

The peas-and-oats hay where manure was hauled but no fertilizer used, looks poor, spotted, and very weedy (chiefly lamb's quarter). It was seeded late - May 20-22. On an adjacent field where the hay crop followed potatoes given manure and fertilizer, it is better.

He has good Arctic Seedling potatoes. He uses 300 lbs. to the acre, when potatoes are planted, of a mixture made up of sodum nitrate, 1/4 sack; muriate of potash, 1 sack; and 46% superphosphate, 1 sack. This is roughly a 1-9-9 ratio.

The soil is nearly level, less well drained, and more moist than sample No. 33 on the Folk farm. The mottling is more intense and nearer the surface. The soil is about like that on the Anderson farm near Palmer. In contrast to the Palmer area, there is little wind in winter; but in the spring there are strong winds off the Knik glacier.

He has a very small greenhouse attached to the house. The tomato plants look well but were obviously set out too late. The garden is poor. (Because, he says, the

KA XI.3 July 26, 1946
Nelson farm at Bodenburg Butte. Marquis wheat.

wife was having a baby when the garden and greenhouse needed attention!)

A short distance north of this farm, along the main road, the gravel again appears at the surface.

We return to Palmer for lunch. Immediately afterward, Kessler, Nygard, and I take the command "car" out northeast of Palmer on the road to Willow. Shortly after passing Johanson's farm, the land is more rolling and bumpy with gravel near the surface. At about 10 miles out I examine a Podzol on poorly reworked glacial outwash like the one we saw yesterday on the Wasilla-Knik road. Here also the solum is developed from very fine sand, similar in texture to the dark-colored soils near Palmer. Is the difference in color and Podzol development a matter of age or lithological composition of the materials, or what?

After we pass the Little Sutsitna River - a beautiful, rapid stream of clear water (KA XI.6) - we enter low mountains, well covered with vegetation. Soon there are trees only in the stream valleys. Ferns and wild flowers grow abundantly in the dwarf shrub cover.

About 20 miles from Palmer, near the divide on the Willow Creek road we examine an Arctic (Alpine?) Mountain Meadow soil.

KA XI.6 July 26, 1946
Little Susitna River northwest of Palmer.

KA XI.7 July 26, 1946
19 miles or so northwest of Palmer. Arctic Mountain Meadow soil with mounds, general view.

This area has an interesting pattern of low mounds, some 2 to 7 feet across and 6 to 18 inches high. We examine a place where the slope is 8%, but this micro-relief runs up on slopes well over 30%. Where the pictures were taken, the mounds occupy roughly 75% of the area.

The soil is well covered with a dense vegetation. Crowberry (Empetrum nigrum) is dominant. Also I see a dwarf rubus, dwarf blueberry, carex, and many other flowering plants as well as mosses. Carex and herbaceous flowering plants are somewhat more abundant between the mounds than on them. The solum through the mound resembles Mountain Meadow, that of the soil between mounds, a Mountain Podzol. The two profiles, about 3 or 4 feet apart, are as follows:

Mountain Meadow soil

A_0	4-0	Dark brown peaty mat.
A_1	0-9"	Dark brown heavy silt loam, high in humus.
B_2	9-10"	Like above, but more reddish and compact.
B_3	10-18"	Yellowish-brown gravelly sandy loam. Slightly compact but easily friable.
C-D	18 +	Light olive-brown, stony, imperfectly weathered schist.

Mountain Podzol soil

A_0	1-0	Brown peaty mat and roots.
A_1	0-1"	Brown loam.
A_2	1-2½"	Light grayish-brown loam.
B_2	2½-2"	Dark brown gritty loam, with some reddish tinge.
B_3	9-13"	As B_3 in Mountain Meadow soil described above.
C-D	12 +	As C-D in Mountain Meadow soil described above.

We finish pictures and notes just ahead of a mountain storm. Some of the pictures may not be good - too much hurry. 1/

Back to Palmer and I get things in order to start for the Aleutians.

•

1/ Later: The colored pictures show purplish red soil like the Tropics! Film poor.

Mountain Podzol soil

A_0	1-0	Brown peaty mat and roots.
A_1	0-1"	Brown loam.
A_2	1-2½"	Light grayish-brown loam.
B_2	2½-5"	Dark brown gritty loam, with some reddish tinge.
B_3	5-12"	As B_3 in Mountain Meadow soil described above.
C-3	12 +	As C-3 in Mountain Meadow soil described above.

We finish pictures and notes just ahead of a mountain storm. Some of the pictures may not be good - too much hurry. 1/

Back to Palmer and I get things in order to start for the Alaskans.

1/ Later: The colored pictures show purplish-red soil like the Tropics! Film poor.

KA XI.9 July 26, 1946
19 miles or so northwest of Palmer. Arctic Mountain Meadow soil with mounds, close view.

KA XI.10 July 26, 1946
19 miles or so northwest of Palmer. Arctic Mountain Meadow soil profile.

July 27: Palmer, Anchorage, and Fort Richardson

In the morning pictures were taken of the group just before we leave Palmer (KA XII.1) at about 9 o'clock. As we cross the Knik River it is still high and has pieces of floating ice and even large cottonwood trees in it.

A large area of nearly level soil, underlain by gravel, near Fire Lake seems better than most we've gone over. Beyond is mixed stony and gravelly material in gently rolling hills, followed by a series of colluvial-alluvial fans with the road crossing the drainage.

Aamodt, Magruder, Orr, and I come into Fort Richardson, call at the office of the Chief of Staff, get our orders, and make all arrangements to fly out to the Aleutians. This takes much waiting in a very busy office.

After lunch we drive into Anchorage. I make hotel reservations and check plane reservations for the return to Seattle August 8. After much calling I finally locate Mr. Anderson of the Farm Security Administration digging in the basement of a new house he intends to move into. He says he has a copy of the SCS maps and will send them to Dr. Nygard at Palmer. He has no text or report.

Anderson's place is out near the end of P Street. The soil is a well-developed, well-drained loamy very fine sand Podzol, underlain with gravel. Southwest of Anchorage

KA XII.1 July 27, 1946
Palmer. Exploratory research party.
Left to right: Magruder, Savage, Aamodt, Ellis, Nygard, Kemper, Orr, Kellogg, and Edgar.

there are many little suburban homes and gardens - some of considerable commercial importance, although I suspect most are part-time enterprises. A great deal of the soil is well-drained, gently undulating loamy very fine sand Podzol, along with a poorly-drained associate and some areas of peat. The well-drained soil is very much like the Onamia of the northern Lake States, with some approaching Rubicon. The natural cover is largely small aspen.

I look at the soil near Lake Spenard. I see some upland light fine sandy loam Podzol and some in the position of Ground-Water Podzol but without much ortstein. Some patches likely have ortstein because I see some fragments of it along the roadside.

There is a large acreage here of fair soil, considering its excellent location. Fair crops can be grown but for real good yields irrigation, fertilizer, and manure (or compost with peat) will all be necessary. This area deserves further careful attention. A great many families can improve their status enormously by successful gardens in this area on a part-time and "part-family" basis.

In Anchorage we visit two perfectly gorgeous flower gardens. In both there were also vegetables and one had an especially good lawn. In both cases I suspect the

lady does the larger share of the work, which must be great. The people are rather old and certainly not wealthy. It is amazing what they have done. I make no attempt to list the many sorts of lilies, delphinium, columbine, peonies, dahlias, roses, and so on and on that were growing. Alaska is apparently as fine for cultivated flowers as for wild flowers, with pains.

We returned to Fort Richardson where we shall stay the night and be ready to hop off early. We were assigned upper bunks in the transient officer's barracks and weighed in at the airfield. After dinner in the post cafeteria[1] I write a few letters in the Service Club - a nice, quiet clean place - for enlisted men to read, write, and play games in.

With four aspirins and a sleeping pill I hope for a little rest.

1/ It would certainly be a wonderful thing if the manager of this cafeteria could give some pointers to the manager of ours at Plant Industry Station. One can <u>really</u> go in this line. If anyone needs to wait or pause, they must immediately step aside rather than hold up the line. Nor are long drawn out conversations with the cashier permitted!

Headquarters Alaskan Department
OFFICE OF THE COMMANDING GENERAL
APO 942, c/o Postmaster
Seattle, Washington

580 (AG) 27 July 1946

SUBJECT: Invitational Travel Authority.

TO : Dr Charles E Kellogg
Dr Roy Magruder
Dr Olaf S Aamodt
Mr Arthur Orr
Specialists U S Department of Agriculture.

1. The Commanding General invites and authorizes you to proceed via military aircraft from Fort Richardson, Alaska to Naknek, Cold Bay, Unimak, Amchitka, Alaska, and return.

2. Travel by military aircraft is directed as necessary for a war mission. No fare will be assessed for transportation provided by military aircraft.

3. It is requested that you sign the release prescribed under the provisions of AR 95-90.

4. AUTH: AR 95-90.

FOR THE COMMANDING GENERAL:

Arthur McM Murphy

ARTHUR McM MURPHY
Major, AGD
Actg Adjutant General

Headquarters Alaskan Department
OFFICE OF THE COMMANDING GENERAL
APO 942, c/o Postmaster
Seattle, Washington

580 (AG) 21 July 1946

SUBJECT: Invitational Travel Authority.

TO : Dr Charles E Kellogg
Dr Roy Neyrader
Dr Olaf S Aamodt
Mr Arthur Orr
Specialists U S Department of Agriculture.

1. The Commanding General invites and authorizes you to proceed via military aircraft from Fort Richardson, Alaska to Naknek, Cold Bay, Unimak, Kodiak, Alaska, and return.

2. Travel by military aircraft is directed as necessary for a war mission. No fare will be assessed for transportation provided by military aircraft.

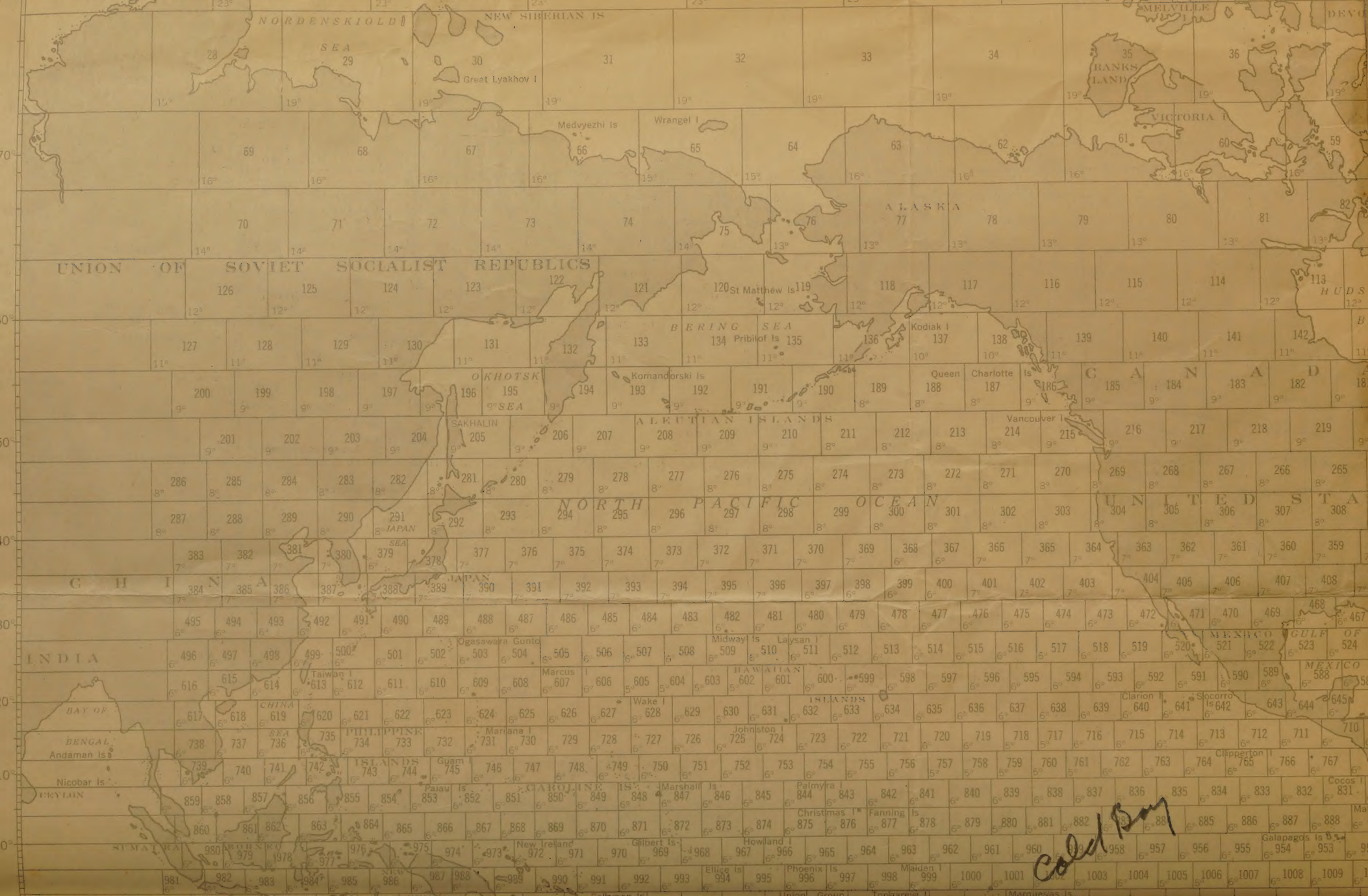
3. It is requested that you sign the release prescribed under the provisions of AR 95-90.

4. AUTH: AR 95-90.

FOR THE COMMANDING GENERAL:

ARTHUR MacM MURPHY
Major, AGD
Actg Adjutant General

RANDALL RADIO
DI-368
RANDALL
93 LF
Randall Tower 396
126.18 Mc
Rbn/Y-396 DF/WYSH-4742.5
Rbn
SCOTCH CAP Z-300
RANDALL STATELLITE
GREEN NO 8
BLUE NO 24
RED NO 40
65°
55°
247°
321°
158°
Sealion Rocks
Amak Island
Lennox Island
Neumann Island
Operl Island
Glen Island
Cape Glazenap
Lemberk Bay
Cabin
Cabin
Cold Bay
Slime Bank
Cape Krenitzin
Bechevin Bay
Morzhovoi Bay
5820 FROST PEAK
Cape Lapin
Cape Mordvinof
Morzhovoi
False Pass (Cannery)
2020
SHISHALDIN VOLCANO 9387 9978
SOUTH ISANOTSKI PEAK
Ikatan Bay
Cannery 1948
Otter Cove
Bird Island
Cape Aksit
Cape Pankof
Cape Lazaref
Metrodon Lake
POGROMNI VOLCANO 7500
Unimak Bight
Cabins
Cape Lutke
Camp
Seal Cape
Ugamak Island
Amaget Island
Umga Island
Thin Point
Fox Island
Deer Island 1985
Midun Island
Fawn Point
Goose Island
Cherni Island
Sarana Island
Buyan Island
Bold Cape
Inner Iliasik Island
Outer Iliasik Island
Belkofski Bay
Belkofski
Cannery
Goloi Island
Dolgoi Island
Poperechnoi Island
Volcano Bay
Ukolnoi Island
Cape Tolstoi
Seal Cape
PAVLOF VOLCANO 8900
Pavlof Bay
Iven Island
MOUNT DANA 4200
Black Hills
Beaver Bay
Unga Spit
Jude Island
Wosnesenski Island
Kennoys Islands
Acheredin Point
Sanak Island 1740
Long Island
Caton Island
Elma Island
Sanak Reef
KUDIAKOF ISLANDS
PAVLOF ISLANDS
UNIMAK ISLAND
SANAK ISLANDS


NORDENSKIOLD SEA
NEW SIBERIAN IS
Great Lyakhov I
Medvyezhi Is
Wrangel I
BANKS LAND
VICTORIA I
ALASKA
UNION OF SOVIET SOCIALIST REPUBLICS
St Matthew Is
BERING SEA
Pribilof Is
Kodiak I
OKHOTSK SEA
Komandorski Is
Queen Charlotte Is
CANADA
SAKHALIN
ALEUTIAN ISLANDS
Vancouver I
NORTH PACIFIC OCEAN
UNITED STA
JAPAN SEA
JAPAN
CHINA
Ogasawara Gunto
Midway Is
Laysan I
MEXICO
GULF OF MEXICO
INDIA
Taiwan I
Marcus I
HAWAIIAN ISLANDS
BAY OF BENGAL
Andaman Is
Nicobar Is
CEYLON
PHILIPPINE ISLANDS
Mariana I
Wake I
Johnston I
Clarion I
Socorro Is
Guam
Palau Is
CAROLINE IS
Marshall Is
Palmyra I
Cocos I
Christmas I
Fanning Is
SUMATRA
New Ireland
Gilbert Is
Howland I
Galapagos Is
Ellice Is
Phoenix Is
Malden I
Cold Bay

ALEUTIAN TRIP

July 28: Fort Richardson to Cold Bay

Up at 3:30 a.m., and without much sleep. Such a place! Young officers kept coming in noisily at all hours. (The General threw a big party last night.) For breakfast at the airport I have 2 cups of coffee. We are off at 5:00 a.m. in a C-47 - a 2-motored cargo plane. There is some freight, two nurses going to Adak, and 2 other passengers.

We fly down over Kenai peninsula but it is quite hazy. There are many small lakes and ponds and an irregular pattern of marsh-bordered streams. This is a wild and desolate area with patches of heavy forest, thin forest, muskeg, and marsh. It becomes more and more cloudy until one cannot see the ground after a half-hour.

There is a bad draft in the plane. The heater doesn't work and it becomes cold. I loan to one of the nurses a sweat shirt I had just bought at the PX in Fort Richardson.

We see a few mountain peaks poking up through the clouds. I try kodacrhomes - probably a waste.

We are down through the clouds at Cold Bay at 9:45 a.m. Breakfast first and then to our quarters. The camp is on a low undulating and gently rolling plain well covered with

KA XIII.1 July 28, 1946
North Kenai. Landscape.

green vegetation that looks to be grass (but isn't much). I see several broad, wet, green valleys 25 to 100 feet below the general level.

Although entertaining a general, a colonel, and a lieut. colonel on inspection, Captain Weyant, the C.O., takes us out in his car. It rains gently.

We stop in the Arctic Meadow[1] to examine the soil. The surface is gently undulating. There is an almost universal micro-relief like that described near the divide on the Willow Creek road the afternoon of July 26.[2] The mounds measure about 3 to 7 feet across and are ½ to 2 feet above the intermound spaces. The vegetation is predominantly crowberry, along with brome grass, carex, dwarf willow, dryas, mosses, etc.

The sample is taken from a fresh cut through a mound and a picture of the profile is taken in an old pit a few feet away. I take soil samples (with Magruder's help).

1/ Locally called Tundra, but does not have permafrost. For this report I shall limit Tundra to the regions of everfrozen subsoil.

2/ Unlike the situation along the Willow Creek road, there is no suggestion whatever of Podzol.

Sample No. 50[1] (Taken fast in the rain)

A_{00}	3-2"	Matt of living moss and roots.
A_0	2-0	Brown peaty mat.
A_1	0-2½"	Dark brown very fine sandy loam.[2] Finely granular and very friable.
B_{10}	2½-12)	Dark brown silty very fine sandy loam. Friable. Somewhat more compact than the above. Some fine roots.
B_{11}	12-32")	
C	32-36"+	Brown loam. Friable. Rubs to slick smear.
D	48" +	Gravel.

Likely the soil is developed from volcanic ash over outwash or marine terrace. Pavlof volcano is only a few miles east.

The ground here is said to freeze to a depth of 4 or 5 feet, but there is no permafrost.

In a wet area near the coast - a low entrant into the sharply dissected upland - is tough, raw, brown, sedge peat 2 feet deep over gray sand. The surface has living sphagnum moss, equisetum, carex, reeds, frittalaria, and a little cotton grass.

1/ I start here with 50 to leave some numbers for Dr. Nygard around Palmer. Of course, these notes include only samples taken by me or by Iver and me together.

2/ Likely some of my textural designations in the Aleutians are in error, partly because of the large amount of organic matter in the soils and the character of the volcanic ash, as well as the extremely short time I had available to examine, sample, and describe the soils.

KA XIII.2 July 28, 1946
Cold Bay. Arctic Meadow soil with well-developed micro-relief. Site of sample No. 50.

KA XIII.3 July 28, 1946
Cold Bay. Site of sample No. 50.

KA XIII.4 July 28, 1946
Cold Bay. Cut in Arctic Meadow soil, near site of sample No. 50.

KA XIII.5 July 28, 1946
Cold Bay. Slip scar

KA XIII.5

KA XIII.5 July 28, 1945
Gold Bay. Ship mast

I see some blue top along the roads. I also see some blue lupines resembling those Professor Prianischnikov showed me in Moscow last summer, which he regarded highly for green manure on Podzols.

After lunch a corporal takes us out north toward the foothills of Frosty Mountain. We are soon in rolling country, rather choppy, with gravelly ridges. The soils are very similar to that already described under sample number 50, except for variations in depth and texture. I see a few slips and photograph one (KA XIII.5). The frequent surface boulders suggest reworked glacial drift. Every place we see or dig, the soil is underlain by water-sorted sand and gravel.

On some of the lower slopes I see a few old clumps of willow and alder in well-protected places.

In some exposed places on coarse sandy and gravelly areas of shallow soil we find (and collect) red arctic azalea (R. Kamtschaticum) plants. Over the landscape are many other flowers and ferns.

Disturbed cuts soon show a finely laminated appearance as a result of weathering, likely wind. The form is wholly surface.

Back again to our barracks. It is cold and wet and the oil stome feels good. Magruder and I pack azaleas to

go back to Beltsville by air. I hope they make it. I lay out the soil samples around the stove.

In the short time available I saw no suitable cattle pasture. There is very, very much less grass than there appears to be from the plane, or even from a car. Sheep could be run in summer and probably some hay could be cut from the swampy areas but I doubt that any practical success could be had. I doubt that gardening would be practicable except under glass. Apparently the frost-free season is long enough but sunshine is low. Perhaps lettuce, chard, onions, radishes, turnips, etc. could be grown in frames under glass. There is even less sunshine here than at Umnak. Yet nearly all day there was a spot of sunshine on Frosty Mountain!

After these speculations I go do bed amid a lot of chatter from pilots in the same barracks. Those boys beef, beef, beef, like cooks. But it doesn't mean a thing. They have competence and courage.

ALBERT MITCHELL
88 LF
TOWER 278
126.18 Mc
NCI 2550
YUKON ONE ONE 4560
126.18 Mc
TANAGA
118 TANAGA
NUD-1 3195
VOLCANO 6975
ADAK
10 LF
TOWER 396
126.18 Mc
WYUQ 4220
RANGE/NCI 302
NUD-11 2550
ADAK ISLAND
KANAGA ISLAND
TANAGA ISLAND
KANAGA VOLCANO
GREEN NO 8
RED NO 40
DANGER AREA
ADAK CONTROL AREA
Great Sitkin Island
Kagalaska Island
Little Tanaga Island
Anagaksik Island
Tagalak Island
Ogliuga Island
Skagul Island
Ugidak Island
Tag Island
Ulak Island
Kavalga Island
Unalga Island
Gareloi Island
ACTIVE VOLCANO
Amatignak Island
Tanadak I
Atka I
Kasatochi Island
Koniuji Island
Ogliodak Island
Cape Kiknn
Cape Azamis
Cape Sajaka
Cape Amagalik
Cape Kagigikak
Cape Yakak
Cape Chunu
Salamatof Shoal
Tanaga Bay
Kuluk Bay
Andrew Bay
Scripps Bay
Sand Bay
Chugul Pass
Tagalak Pass
Kagalaska Strait
Bay of Waterfalls
Sharp Pt
Turret Point
Boot Point
Swallow Head
Teapot Rock
Cape Adagdak
North Cape
Town
Adak
Kanaga Bay
Tanaga Cove
Chuniak Bay
Igitkin I
Ulak I
Cape Kiknn
ALEUTIAN ISLANDS
PACIFIC OCEAN

Adak

Scale 1:1,000,

20 0 20 40

0 10 20 30

10 0 10 20 30 40

AERONAUTICAL SYMBOLS

UNCLASSIFIED ___ 205

FIELD ___ 205

LITARY-CIVIL AIRPORT ___ 205

(NUMERALS INDICATE HEIGHT ABOVE SEA LEVEL)

IAL OR MUNICIPAL AIRPORT ___ 205

TRIP (LANDING AREA ADJACENT TO HIGHWAY) ___ 205

DICATES DIRECTION OF RUNWAY)

CY LANDING FIELD ___ 205

E BASE ___

E ANCHORAGE (WITH REFUELING & LIMITED FACILITIES) ___

ED ANCHORAGE (NO FACILITIES) ___

RADIO FAN MARKER ___

RADIO MARKER BEACON (WITHOUT VOICE) ___

RADIO MARKER BEACON (WITH VOICE) ___

NON-DIRECTIONAL RADIO BEACON (TYPE H) ___

RADIO RANGE ___ (BEARIN

275° 95°

FINAL APPROACH LEG (HEA

RADIO RANGE NOTE (AT NEAT LINE) ___

July 29: Adak

We take off from Cold Bay in the fog and rain at 7:30 a.m. In a few minutes we are flying above a dense cloud cover. One cannot resist taking pictures of the peaks above the clouds. I see a peculiar cloud formation like a double umbrella over the peak of Mt. Shishaldin on Unimak Island (KA XII.3).

The clouds break for a good view of Seguam Island.

Although we ride over a nearly complete cloud cover, I can see that the clouds break near the south shores of the islands.

At 11:50 a.m. we come down at Adak. There is a serious diphtheria epedemic here and we are told to be very careful and mingle with the men just as little as possible. Parts of the area are completely quarantined.

A Mr. Boyd, civilian housing manager, takes us out near the camp. The airfield and camps are built on smooth made land; produced by shoving a large hill into a lake. The bulldozers certainly remade this place. Most of the land is rolling or mountainous. The lower slopes are well covered with vegetation while the higher slopes are bare, except for snow banks.

The camp now has a total of about 5 or 6 thousand, with very few women.

KA XII.3 July 29, 1946
Mt. Shishaldin on Unimak Island.

KA XII.4 July 29, 1946
View west of Dutch Harbor.

KA XII.5 July 29, 1946
Island of Four Mountains

Fig. XII.5 July 29, 1916
Island of Four Mountains

An active volcano is in view but is not active today.

Palisade cliffs suggest basalt. Along the coast I see considerable beach grass. The continuous green cover up hill and down dale is amazing. We stop in a deep cut made for a hut. I take sample of the yellow bands of coarse material (pumice ash) at 2 feet and 6 feet (Sample No. 51). The soil profile resembes No. 50 near Cold Bay but the micro-relief, so prominent and general there, is only feebly expressed here. In the cover there is more carex and blue top along with beach grass, poa grasses, orchids, iris, and other flowering plants. The profile shown in KA XII.6 is in the edge of a sort of bench on a steep hill. Likely the grass is thicker near the roadway where there has been considerable disturbance. Near the sea is some present evidence of soil blowing following disturbance.

We are assigned a nice hut to ourselves - No. T-426. It has two nice rooms heated with oil burners, each with two beds and a desk. There is a lavatory between. When oil is needed one goes to the nearest tank outside and draws it off, just like going to a wood pile or to the well for water. At the cafeteria we eat after the main group. Men are not allowed closer than 5 feet from one another.

KA XII.6 July 29, 1946
Adak. Deep road cut showing layers of volcanic ash. Site of sample No. 51 - pumice ash.

KA XII.7 July 29, 1946
Adak. Cut into large soil mound - the first one described on Adak.

After lunch we drive out toward Moffet Mountain. On the undulating slopes and rolling land there is considerably more grass than on soil No. 50 near Cold Bay.

There are large natural mounds here, not very thickly spaced - say 6 or 10 to the acre. These are 8 to 15 feet across and 3 to 6 feet high. The surface 2 or 3 feet is very spongy - mosses and crowberry roots. (See KA XII.7)

Profile through center of mound:

A_{00}	24-4"	Loose, soft mass of moss and roots.
A_0	4-0	Reddish-brown peaty mat.
A_1	0-20"	Very dark brown highly organic, plastic silt loam.
A_3	20-25"	Transitional
C	25" -	Yellow, coarse pumice, like sample No. 51.

The well-developed micro-relief of Cold Bay is almost lacking here (but not quite). What about the cause of these mounds? Hydrostatic pressure, forcing the soil of A_1 upward, perhaps coupled with some mud flow in the spring? Large moss-covered boulders in the hills look the same as these mounds of soil at a distance.

On a 5% northeast slope one sees: crowberry, sphagnum, a little carex, blue top, dwarf dogwood, rubus, lupines, wild geranium, equisetum, wild parsnip, beach grass, and

KA XII.8 July 29, 1946
Adak. Close view of moss and cranberry ow growing over huge boulder of volcanic agglomerate.

KA XII.9 July 29, 1946
Adak. General view of slopes of Mt. Moffett. Note Tundra-like landscape but permafrost is absent.

others. Even on stony upland slopes there is a deep mossy cover. From the road in a car one gets the impression of more grass than there is, yet there is more here than in any other Arctic Meadow I've so far seen.

Apparently military maneuvers were once held here. The little fox holes in this peat-covered soil, half full of brown water, don't look very cozy.

Moss and crowberry grow over and cover huge boulders of volcanic agglomerate (KA VII.8) with a peaty mass 2 to 6 inches thick directly upon solid rock.

High up on the nearly flat top of a sloping ridge running down from Mt. Moffett I take a sample of soil and carex.

Sample No. 52.

A_{00} & A_0	5-0	Brown peaty mat.
A_1	0-5"	Nearly black slick, wet, silty very fine sandy loam or silt loam. Highly organic and many roots.
B_2	5-10"	Nearly black granular loam.
B_3	10-15+	Dark grayish-brown, rather slightly gritty loam. This grades into yellowish and brownish horizontally streaked materials - likely ash layers.
C	at 30"	Yellowish-brown heavy sandy loam.

The top of the ridge is well covered with moss, crowberry, carex, etc., but not so wet and spongy as on the lower slopes near the big mounds.

Nearby (near the rifle range) I take surface samples in a wet alluvial bottom, along a rapidly flowing stream, which merges into a coastal beach. The sample is taken far above tidewater. At the place of merger this valley must be 3/4 of a mile wide, with steep slopes on each side. It could be drained and made into a considerable hay meadow without excessive trouble. A grass sample is taken by Olaf.

Sample No. 53

(1) 0-3" Dull brown, slick, highly organic silt loam. Many roots.

(2) 3-6" Dark brown, mucky silt loam. Many roots.

(3) 6-10" Brown sandy loam, mottled with reddish-brown and brownish-gray.

It begins to rain as a dense fog rolls in from the sea and we start back.

Parts of the airfield were seeded (between July 10 and 15, I'm told) with what appears to be a mixture of brome grass and barley. It is growing fairly well, especially where not too wet.

I lay my samples around the stove to dry 1/ and go to dinner.

1/ For this purpose I took the bedside stand from the side of Mr. Orr's bunk, roughly throwing his gear on the bunk. For his forbearance, in the interest of science, he deserves much credit.

In the evening Mr. Coats of the U. S. Geological Survey visits us. Like several other geologists in the Chain, he is studying the volcanos. He suggests that andesitic porphyry is prominent among the older rock, confirming a guess I made today. He thinks there were some glaciers and some volcanic activity during Pleistocene; but no volcanic activity since then on Adak, although there has been up to very recent years on other islands. The pumice I saw today was probably laid down during glacial times. Often it overlies the drift and sometimes the two are mixed. He often finds it difficult to distinguish between till and mud flow deposits.

He says Kanaga and Tanaga Islands likely had little or no glacial action. The former island is a marine-lifted bench covered with ash. The ash on Tanaga is 10 to 15 feet deep.

It is said that cattle were raised on Kanaga many years ago but no evidence remains. (A soldier, I heard, wants to homestead on Tanaga Island !)

He (Coats) says there are very few mammals on the islands here except for blue foxes, which are native to some islands and were introduced on others. Many islands in the Chain, he says have hot springs. I marvel that this

young man had never even noticed the conspicuous soil mounds that bothered me today!

Late to bed, and very tired.

HEADQUARTERS U. S. TROOPS
APO 980, c/o Postmaster
Seattle, Washington

28 July 1946

SUBJECT: Quarantine for Diptheria.

TO : All Unit Commanders and Civilians.

1. Gradually more and more cases of diptheria have been developing in the Army area. A few cases were to be expected as there had been intermingling of Army and Navy personnel prior to discovery of the initial cases among Navy personnel. The spread of cases, however, has been out of proportion to expectation and can only be accounted for by laxity and indifferance in unit restriction instructions.

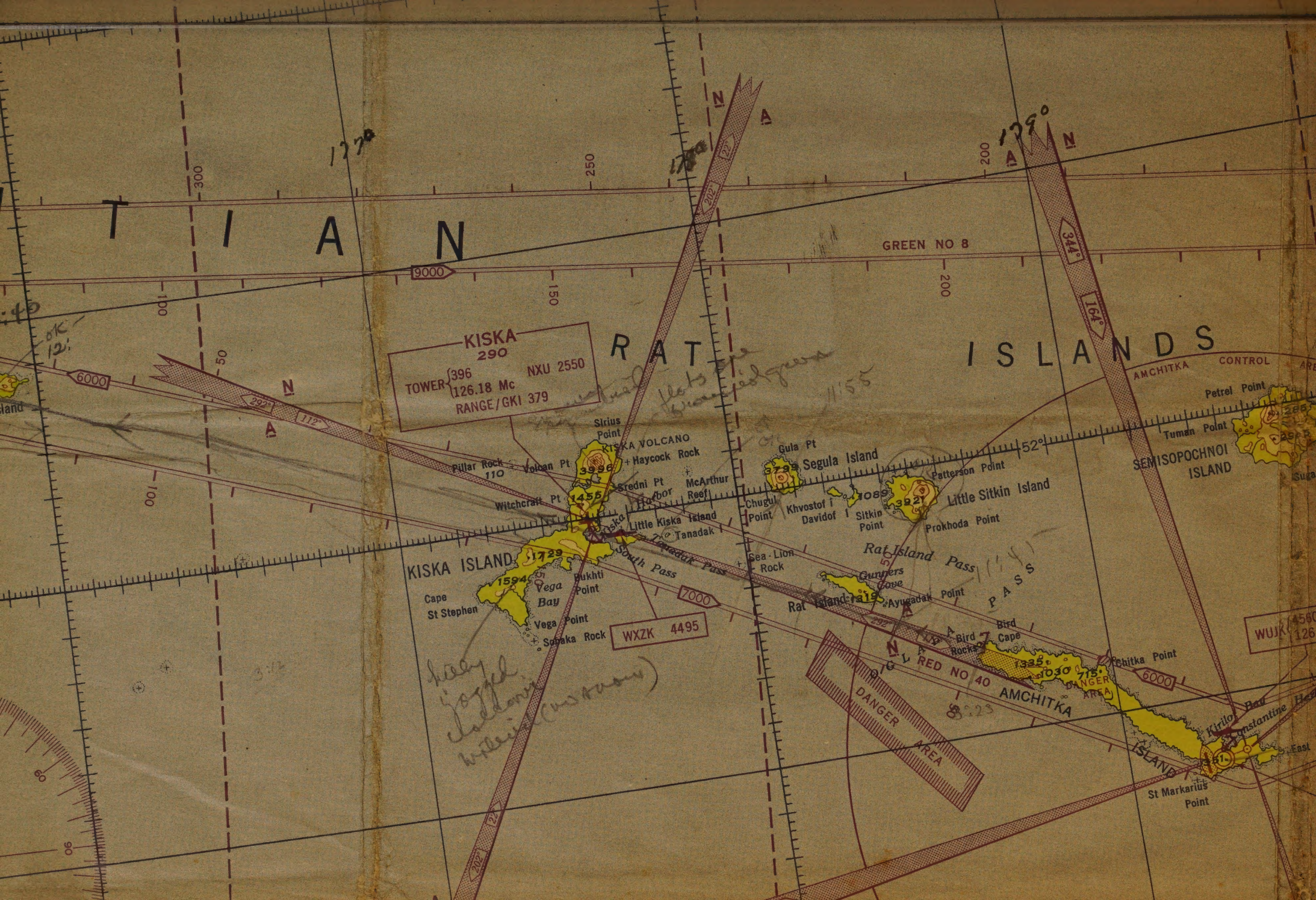
2. Two enlisted men visited their friends in the hospital and got away before they could be apprehended. An officer tried to get by the MP guarding an area under strict isolation. An officer of a strictly isolated unit left his unit to buy cigarettes. Two men from a hut which a medical officer had recommended be strictly isolated were put on KP because they happened to be next on the duty roster. These are a few of the violations of orders and common sense which have come to the attention of this headquarters.

3. The individual may have little regard for his own health and well being. To some extent, that is his own business. But the health of each individual concerns the health of every person on this island. The individual may not care whether he gets diptheria or not but he displays a callous, criminal disregard for others if, by his carelessness and disobedience of orders, he helps to spread the disease among his fellow soldiers.

4. Diptheria is not a disease with which to trifle. About one in every five can be expected to contract the illness unless strict preventive measures are taken. A few will die if not treated promptly. Early treatment alone will prevent serious and permanent heart and kidney damage. Older men are less apt to contract the disease but are not exempt from contagion. Prompt reporting at sick call is essential. The man most seriously ill at the present time waited four days before reporting. The individual should report to sick call at the least sign of a sore throat, cough, cold or fever.

5. In civilian communities, control of the disease is fairly simple; a quarantine sign on the door isolates all members of the household and restricts the possible contacts to a few persons. This is not the case here. The close contact of individuals in mess halls, latrines and huts provides an excellent chance for the spread of the disease. Weather is against us. The worst enemy of the diptheria bug is warm sunshine. Lest there be any misunderstanding of the problem, Adak has had more cases of diptheria in the past week than the entire State of New York with its fifteen million people during a like period.

(over)


T I A N
R A T I S L A N D S
GREEN NO 8
KISKA
290
TOWER 396
126.18 Mc
NXU 2550
RANGE/GKI 379
Sirius Point
KISKA VOLCANO
Haycock Rock
Pillar Rock
Volkan Pt
3996
Sredni Pt
Harbor
McArthur Reef
Witchcraft Pt
1455
Kiska
Little Kiska Island
Tanadak I
Tanadak Pass
South Pass
KISKA ISLAND
1729
1594
Vega Bay
Bukhti Point
Cape St Stephen
Vega Point
Sovaka Rock
WXZK 4495
Gula Pt
3799
Segula Island
Chugul Point
Khvostof I
Davidof I
1089
Sitkin
3827
Sitkin Point
Little Sitkin Island
Patterson Point
Prokhoda Point
Rat Island Pass
Sea-Lion Rock
Gunners Cove
Rat Island
1319
Ayugadak Point
PASS
Bird Rocks
Bird Cape
1335
1030
715
DANGER AREA
Ichitka Point
RED NO 40
AMCHITKA
ISLAND
DANGER AREA
Kirilof Bay
Constantine Harbor
East
St Markarius Point
AMCHITKA CONTROL
Petrel Point
Tuman Point
SEMISOPOCHNOI ISLAND
WUJK
52°
55°
9000
7000
6000
344°
164°
292°
112°
202°
22°

6. The medical officers of this post are greatly overtaxed. Thus far, they have been able to pick up all cases early and institute treatment before the disease could produce its severe complications. No one has died and no one is now seriously ill, but the hospital is full. If allowed to run unchecked, there would be so many cases that the hospital would only be able to treat the seriously ill. Everyone must do his full share towards bringing the epidemic under full control quickly.

7. It is the desire of this headquarters that every unit and group isolate itself to the maximum extent possible. First, each unit must pretend that every one in every other unit has the disease and stay away from them. As far as is possible, no one from one unit should approach anyone from another unit closer than ten feet. Only absolutely essential intermingling of personnel will be tolerated. Officers are especially enjoined in this regard. Second, each unit will be broken down to the smallest component living parts and each "part" wil hold as suspect each other "part". These "parts" (preferably hut groups) will stay together at work, rest, recreation and mess. To the maximum extent possible they will avoid each other "part" of the unit.

8. In the event that one man is suspected or actually contracts diptheria, the other men of that unit "part" will be strictly isolated on the order of the inspecting medical officer who is hereby authorized to issue such orders in my name. Such isolated "parts" will be given special hours for eating, bathing, etc. and will be avoided as if it were known that they had contracted the disease. This does not mean that every man who lived in a hut with a man who contracted the disease will also get the disease but they are more likely suspects. It will be remembered that even without precautions only about one in five could be expected to contract the disease. Daily inspections and throat cultures will be done by the medical staff on the other members of the hut until all possibility of infection has passed. Any who may contract the disease will thus be discovered and treatment begun at the earliest possible moment.

9. Starting tomorrow, 29 July 1946, the work of Army personnel will be restricted to essential activities. Work will be done by unit "parts". Non-commissioned officers and hut leaders will be held strictly responsible for insuring the maximum isolation of their men in compliance with the letter and spirit of this order. Each officer by his own conduct and initiative, will exert his utmost in carrying out the spirit of this order.

10. Fullest cooperation will be given to the advice and recommendations of the medical officers.

11. This headquarters considers violations of orders issued with respect to quarantine to be serious disobedience of orders and <u>not</u> minor matters punishable under the 104th AW.

12. The provisions of this letter apply to every officer, warrant officer, flight officer, enlisted man, civilian employee, Red Cross, and dependent with the Army at Adak.

13. The provisions of this order will be brought to the attention of all personnel of the unit immediately upon receipt.

A. M. GURNEY
Colonel, FA
Commanding

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TUNNELS (RAILROAD OR HIGHWAY)

MINES & QUARRIES

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• 5268 HIGHEST ELEVATION ON CHART

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STREAMS & RIVERS (INTERMITTENT)

STREAMS, RIVERS, LAKES & COASTLINES (UNSURVEYED)

RAPIDS & FALLS

CANAL — CANALS

ONE FATHOM LINE (6 FEET BELOW LOW WATER LEVEL)

ROCKS

INTERMITTENT LAKES

GLACIERS

SWAMPS & MARSHES

REEFS & SHOALS (AREA BETWEEN HIGH

Amelia the

July 30: Amchitka

After breakfast we are confined to our hut on account of the diphtheria epidemic and the bad, foggy weather. At 2:30 p.m. we received word to be ready to leave. First we must go to the air medical offices for a health clearance. Then to the airport.

We leave Adak at 4:45 p.m., and are glad to be away. West of the base I saw evidence of slips and mud flows on the steeper slopes. Next to the bay are several palisade cliffs. The land surface is very rough and bumpy, corresponding to the irregular rock surface. There are many little islets in this bay. The small-scale micro-relief of Cold Bay is not much in evidence.

As we started to cross Kanaga Island, we passed over a cloud but I get a good view of Kanaga volcano, a nearly symmetrical cone.

Tanaga volcano has much more snow on it than most others I've seen in the Chain. We get a fair view of an active volcano on Gareloi Island.

As we come into Amchitka, it appears to be low and wet and covered with less luxuriant, browner vegetation than on Adak. I see many small, irregular lakes. We land at 6:22 p.m.

KA XII.10 July 30, 1946
Tenago volcano.

After some needless delay, we have supper and get out to look at the land.

From the pits around the sprawling camp - a large part of which is now unoccupied - the soil appears like Arctic Meadow, underlain deeply by gravels, perhaps of reworked glacial origin. One sees many spots of beach grass and carex - but not good grazing. Broadly, the land is undulating, with many short, steep slopes, probably following quite closely the outline of the rocks beneath. In places the underlying hard rock is only a few inches beneath the surface. There are large numbers of small grass swamps and ponds at different levels. Often the water surface of ponds only a few hundred feet apart vary 20 feet in elevation.

One sees many seepy spots. Here and there is evidence of wind deposits.

There are some large soil mounds 3 to 4 feet high and 12 feet across, like those described on Adak (KA VIII.8).

On comparatively smooth, fairly well drained upland, I take a sample of soil and Olaf one of carex. In the cover is some blue grass, several kinds of mosses, lichens, dwarf dogwood, and other flowering plants. The area has a low micro-relief with a smaller percentage of the surface some 6 inches lower than the rest.

KA XIII.6 July 30, 1946
Amchitka. Characteristic seepy spot near camp.

KA XIII.8 July 30, 1946
Amchitka. Characteristic soil mound near site of sample No. 54.

Sample No. 54

A_{00} & A_0	½"-0	Moss and lichens.
A_{10}	0-2"	Very dark brown silt loam, highly organic. Many roots.
A_{11}	2-5"	As above but less roots.
B_1	5-12"	Brown loam
B_{20}	12-15"	Very dark brown loam somewhat cemented.
B_{21}	15-18"	Like above but more cemented - nearly ortstein. Some small pebbles.
C	18-20 +	Brown gritty loam.
D	Below 20 -	Loose rock.

I see many swamps. The one I dig into has well-matted brown fibrous peat. On the surface are many little mounds, 1 to 3 feet across and 6 to 12 inches high, made up of moss. Some of these peat areas are very swampy; others are firm.

In a few road cuts I see a deposit of dark reddish-brown loamy and gravelly material between the soil solum and the green country rock.

The vegetation here is less luxuriant than that at either Adak or Cold Bay and, relatively, a larger part of it is moss and lichens; yet there are no entirely bare places where undisturbed. Moss and equisetum are already growing on the steep sides of excavations made during the war.

KA XIII.9 July 30, 1946
Amchitka. View looking toward wet swampy land from sit of sample No. 54. Note small moss-covered mounds in foreground.

The whole place has a dismal appearance. The largest part of the land we can see around the camp is made up of ponds, swamps, and seepy slopes. No mountains are to be seen.

About 8:30 we return to the camp in twilight. As soon as I am assigned a hut, I lay out my soil samples to dry, straighten out a very sore curled-up back on the floor, and get to bed.

173° 54°
3°E
174°
175° 4°E
176°
54°
53°
DANGER AREA
ATTU CONTROL AREA
SHEMYA CONTROL AREA
CASCO COVE
TOWER 278
126.18 Mc
RANGE/ALM 385
NUP 4220
Unsurveyed
ATTU ISLAND
Cape Wrangell
Kresta Point
Red Head
Stellar Cove
Holtz Bay
Chichagof Harbor
Chishagof
Sarana Bay
Shirikof Pt
ALEXAI POINT (AUX)
35 LF
TOWER 396
126.18 Mc
RANGE/AOG 323
WUUC 4220
RR
266 AUN
SHEMYA
90 LF
TOWER 201
126.18 Mc
Rbn/U 201
RANGE/PF 221
WUUF 4220
SEMICHI ISLANDS
Alaid Island
Shemya Island
Oubeloi I
Alexai Pt
Massacre Bay
Etienne Bay
Abraham Bay
Nevidiskov Bay
Theodore Point
NEAR ISLANDS
DANGER AREA
Patrida Point
Patricia Bight
Krugloi Pt
Agat Pt
1550
McDonald Cove
AGATTU ISLAND
Harrel Pt
Cape Sabak
Ingenstrem Rocks
GREEN NO 8
RED NO 40
Buldir
ALEU
353°
173°
182°
212°
302°
122°
280°
100°
241°
61°
272°
277°
7000
8000
6000
400
350
100
50

Glossary

July 31: Shemya

Up at 6:00 a.m. for an early start to Shemya. I have a good breakfast and am at the airport at 7:30. There we wait for the weather to clear, expecting any moment to take off. At 11:15 a.m. we leave for Shemya - an island of the Semichi group just a few miles east of Attu - where the main base for the end of the Chain is located.

For some time we ride over a nearly continuous cloud cover with occasional glimpses of water and of peaks sticking through the clouds. I see a fine symmetrical peak on Little Sitkin.

We see Kiska nicely. The volcano is nearly symmetrical, and has snow on the upper slopes. Most of the land appears to be broadly gently undulating with local short steep slopes. The brownish-gray, rather than green, color of the cover, suggests a high percentage of moss, as at Amchitka. The south end of the island is quite rugged with jagged, bare central uplands (probably of volcanic material). I see quite a few ponds but not so many as on Amchitka. A very heavy green color is seen only in the small stream valleys and in the depressions. On the west side I see sharp cliffs with palisades.

We pass beyond Buldir Island - with another group of small volcanic peaks. The lower slopes have a greenish-brown color. There is very little snow.

We are down through a heavy cloud cover at Shemya at 1:16 p.m. The island appears to be nearly flat.

There is a great deal of unnecessary delay and bureaucratic confusion over our arrival, our mission, and lunch (at 2:45 p.m.!!). Finally the Officer of the Day sends a sleepy corporal to take us to quarters and to see the land in a broken down "carry-all."

The camp is mostly in swamp - peat; in fact the whole central part of this island is largely peat 6 to 12 feet deep, or wet land, except for a low rise near the center, where we see a rock quarry. On the whole, the vegetation is somewhat more vigorous than on Amchitka. Wild flowers are abundant. We are told that the temperature rarely goes below 20° or above 50°. Thus the soil freezes little, but sunshine is rare. In places there is a narrow, bouldery tidal coast, backed up by steep rocky slopes or cliffs 200 or so feet high. Usually, except where disturbed, even those steep slopes are green with beach grass, moss, and flowering plants. Some of the cliffs are ryholite, others volcanic agglomerate.

In other places the beach is sandy with sandy cliffs. Naturally, these are stabilized with beach grass and other plants; but some have been seriously torn up by traffic and construction and are now badly blowing.

Often the cliffs have a base of hard rock, covered with ash, or with ash and sand, topped with soil. For only a few feet back from the cliff is there normal well drained, or even imperfectly drained mineral soil, rich in humus. A little way toward the interior in most places is peat. This almost continuous rim immediately back of the cliffs serves as a block to drainage - resembles a sort of flange or lip on the island as a great saucer, through which only a few small streams and seeps break out. There is little regular drainage.

The reddish-brown volcanic ash material is often 30 feet deep over the country rock; but only 20 to 300 feet back from such a cliff margin, even on a fair slope, is fibrous peat with a dark brown, fairly well decomposed surface. Where disturbed, beautiful specimens of flowering plants quickly establish themselves on such peat and give an effect of carefully planned rock gardens!

About 200 feet back from a steep cliff, on the rim, I take a soil sample (very hurriedly) along with a mixture

KA XII.11 July 31, 1946
Shemya. View of shore.

KA XII.12 July 31, 1946
Shemya. High bank at edge of sea showing contact between volcanic ash and country rock. Only on the very cliffs does the soil of raw volcanic ash have less than a foot of peat over it.

of grasses, including blue grass, blue top, carex, beach grass, and wild geranium, gathered by Olaf. A few feet further toward the interior is peat.

Sample No. 55

A_0	12-0	Brown peaty mat and roots.
A_1	0-6"	Nearly black silty organic matter.
B_2	6-28"	Dark reddish-brown silty clay loam, streaked with black. Compact.
C	20-60"+	Reddish-brown sandy clay.

There may be a few small areas of upland soils with only a thin layer of peat with nearly normal solums developed from wind-blown sand and/or ash overlying rhyolite.

In places along the beach are rough rocky coastal flats covered with seaweeds. The rocks are light greenish-brown. Andesite? Rhyolite? In other places are volcanic agglomerates and andesitic porphry.

It appears that nearly one-half the entire island surface is paved, has buildings on the land, or is dug up. We see a very large airport for both fighters and bombers.

In the camp area occupied by 478 Quartermaster's Trucking Company (colored troops) Lt. C. H. Clauss, Company Commander, shows us a little greenhouse used the year round for flowers. It is heated by hot air from an

KA XIV.1 July 31, 1946
Shemya. Near Coast: Left to right, country rock overlain with peat, and dune sand with beach grass.

KA XIV.2 July 31, 1946
Shemya. Tidal flats of green volcanic rocks covered with kelp and other sea weed.

KA XIV. 3 July 31, 1946
Shemya. Greenhouse for flowers: 478 Quartermaster's trucking company.

KA XIV.4 July 31, 1946
Shemya. Greenhouse for flowers: 478 Quartermaster's trucking company. (Another view)

oil burner. Electric lights are used. The soil in the benches was taken from old Aleut kitchen middens. Plants can be grown on Shemya!

A large part of the buildings, of which our barracks is typical (KA XIV.5), set on firm ground reached by excavating the fibrous peat. It is amazing how the vertical walls have already become nearly covered with moss and liverworts.

I was told that there are many kitchen middens on Attu Island. This island is mostly rough, but green below 1,030 feet. On Agattu Island it is said there are native Aleuts living.

To bed reasonably early.

KA XIV.5 July 31, 1946
Shemya. My headquarters. The building sets on the solid ground under the peat.

NA XIV-5 July 31, 1945
Okeye. Ig headquarters. The building
sets on the solid ground under the post.

August 1: Shemya and to Umnak

Up early, then wait for word about going to Attu or Umnak. There is fog, but no rain. We get the "run around" from the operations officer at the airport.

Finally the Commanding Colonel and his chief engineer learn we are here! Someone is certainly going to catch it, and should. We now go about with them in the Colonel's car - a real car. (How my back loves that!)

At the engineers headquarters we see a small lawn of fair planted brome grass on beach sand, and some miserable little spruce trees that would grow if properly cared for, I believe.

I pick up a sample of a white rounded fragment, among many, on a strip of beach, which may be chalk or coral limestone.

Also I collect a sample of the material in an old Aleut kitchen midden (Sample No. 56). In a low, much disturbed mound there are many whale bones, fish bones, artifacts, and so on. The material is a softly granular, highly organic, very dark gray loam. These low mounds cover about 1/10 to 1/5 acre and are several feet deep. The heap is layered and cross bedded.

KA XIV. 6 August 1, 1946
Shemya. Disturbed Aleut kitchen midden.
(Sample No. 56)

KA XIV.7 August 1, 1946
Shemya. Disturbed Aleut kitchen midden.
Note whale bones.

Lt. Col. Cunningham says that trafficability for tanks and self-propelled cannon is zero, regardless of military need, on Attu and Shemya.

We visit a rock quarry near the center of the island - the highest part of the island which I estimate to be about 200 feet above sea level. The rocks are brittle volcanics - likely some variety or relative of rhyolite. Above the rock is 3 to 5 feet of well rounded cobbles. This in turn is overlain by ash from which a dark-colored soil is developed. (See KA XIV.8) At the contact between the ash and cobbles are very hard, thin layers of very dark brown ironstone, possibly resulting from hot ashes (?). The cobbles and gravel are made up wholly of volcanic rocks, very well worn by water. Apparently this island was a low marine terrace, since elevated.

With fog and mist this island is probably the dreariest place I could imagine. Recreational possibilities are practically zero. Some boys dig in the kitchen middens for artifacts - old Aleut needles, axes, and the like. But even this "sport" is not officially permitted; such are to be left for the anthropologists. The Colonel tells me that he has an organized university (USAFI) with about 60% participation. Certainly such programs for men in the Aleutians need every possible aid. The boys can't like it

KA XIV.8 August 1, 1946
Shemya - at highest part of Island. Upper edge of big rock quarry. All volcanic rocks with ash above from which highly organic soil is developed.

there and no one can blame them. After all, these boys are doing a job for the whole country, which the whole country seems to want done. They shouldn't be just considered as poor goats who got sent out here. More attention to the morale of these men is needed. As soon as anyone of them finds out what I am doing, the first question is almost always, "Why the hell can't we have trees? Can't you tell us how we could grow them?" And I believe it could be done in the sheltered spots.

Thus are we escorted by the Colonel from 10;30 a.m. to 2:00 p.m., when we leave for Umnak.

Most of the time we ride over solid cloud banks so I take this opportunity to write the requested introduction for a Russian edition of The soils that support us while sitting on a bundle of parachutes. (Seats are too few.)

I get a glimpse of the south shore of western Amchitka. Sharp jagged cliffs rise abruptly from the sea. These have only scanty vegetation.

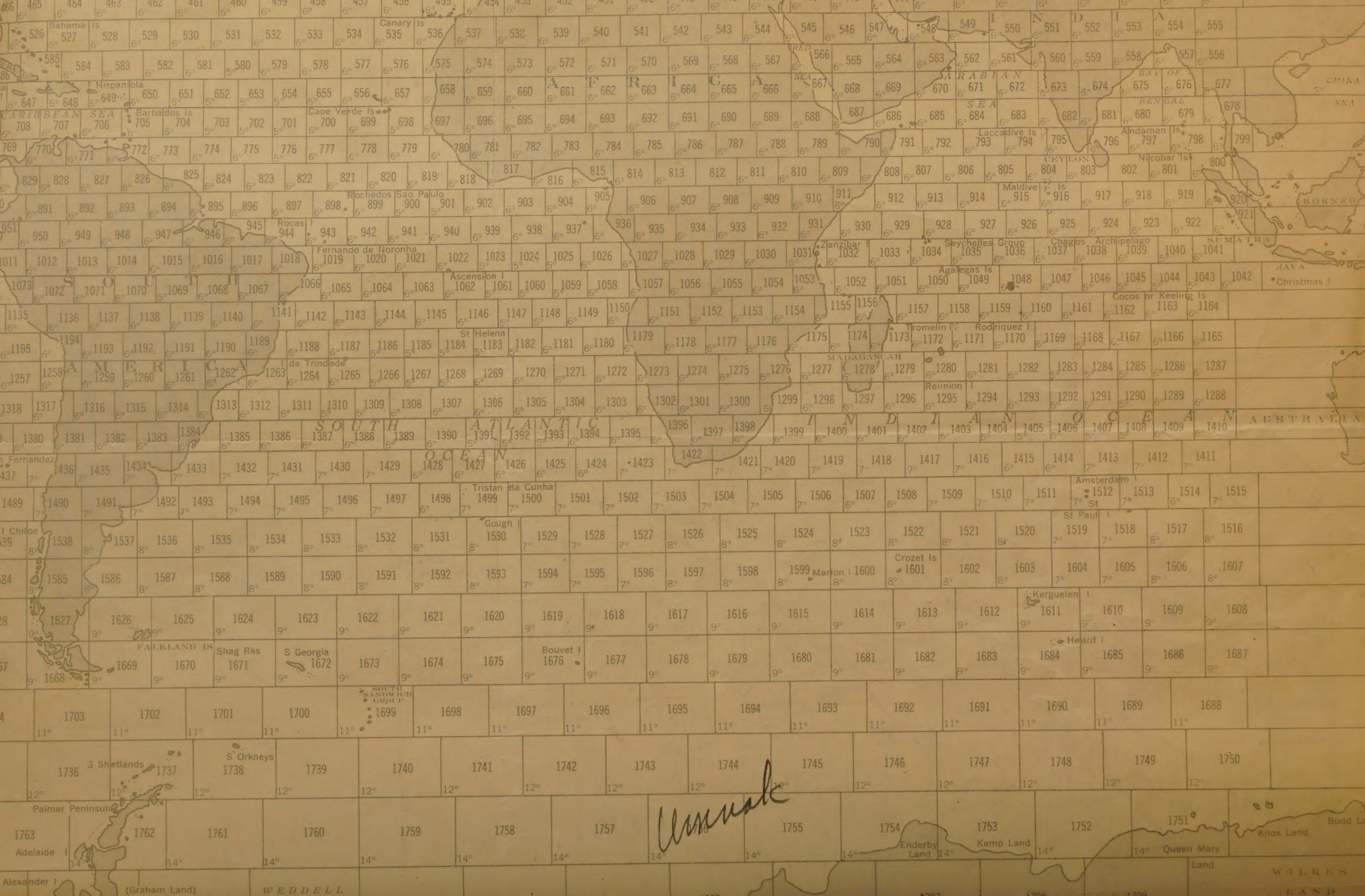
Our pilot - hardly more than a mere boy - has difficulty landing at Amchitka but on the third try does a perfect job with less than a 100-foot ceiling. We are nearly an hour waiting and leave at 5:00 p.m.

On the way to Umnak we glimpse some of the islands, which are greenish-brown rather than green. The plane becomes very bumpy in strong, gusty wind. We are down at Glen Field on eastern Umnak at 8:48 p.m.

There is no brass band here ! We are kept waiting for no reason at "operations" for a long time, then hauled in a truck to have a late meal (after which we washed the dishes!). Then a long wait and back to operations! Finally, again in the rough-riding truck, to a transient officers' bunk house at 10:05 p.m. Just as we arrive, it is discovered that Aamodt's bag is lost! 1/ To bed about 10:30 very tired, cross, and sleepy. Many aspirins quiet the back a little.

1/ Later found by the M.P's.

DUTCH HARBOR CONTROL AREA
GLENN CONTROL AREA
NORTH SHORE RADIO
NKU-341
DUTCH RADIO
SY-209
UNALGA RADIO
NCV-269
Rbn
CAPE SARICHEF TTTT-290
Rbn
AKUTAN J-300
DUTCH HARBOR
North Shore Tower 278
Kashega Point 126.18 Mc
Dutch Tower 278
126.18 Mc
GREEN NO 8
BLUE NO 23
RED NO 40
Bogoslof Island
Cape Cheerful
Cape Kovrizhka
Ashishik Point
Cape Idak
Aguliuk Point
Cape Kigunak
Inanudak Bay
PACIFIER
Kohets Head
The Pillars
South Rock
Lance Point
Eagle Point
Ogangen Island
Whalebone Cape
Sedanka Island
Beaver Inlet
Makushin Bay
Skan Bay
Alimuda Bay
Kashega
Starayd Bay
Unalga Pass
Akutan Pass
Akun Head
North Head
Akutan
Ridge Point
Akutan Bay
Akun Island
Akun Bay
Tanginak Island
Round Head
Reef Point
Cape Morgan
Battery Point
Rootock Island
Pinnacle Rock
Avatanak Strait
Akun Strait
Derbin Strait
Tigalda Island
Avatanak Island
Cape Sarichef
Miles from Atka
UNIMAK ISLAND
UNALASKA ISLAND
AKUTAN ISLAND


SOUTH AMERICA
SOUTH ATLANTIC OCEAN
INDIAN OCEAN
AUSTRALIA
ARABIAN SEA
CARIBBEAN SEA
RED SEA
BAY OF BENGAL
CHINA SEA
CEYLON
MADAGASCAR
SUMATRA
JAVA
BORNEO
Bahama Is
Canary Is
Hispaniola
Barbados Is
Cape Verde Is
Laccadive Is
Andaman Is
Nicobar Is
Maldive Is
Rocas I
Rochedos Sao Paulo
Fernando de Noronha
Ascension I
St Helena
da Trindade
Zanzibar I
Seychelles Group
Chagos Archipelago
Agalegas Is
Cocos or Keeling Is
Christmas I
Tromelin I
Rodriquez I
Reunion I
Amsterdam I
St Paul I
Gough I
Tristan da Cunha
Crozet Is
Marion I
Kerguelen I
Heard I
Chiloe
FALKLAND IS
Shag Rks
S Georgia
Bouvet I
SOUTH SANDWICH GROUP
S Shetlands
S Orkneys
Palmer Peninsula
Adelaide I
Alexander I
(Graham Land)
WEDDELL
Enderby Land
Kemp Land
Queen Mary Land
Knox Land
Budd L
WILKES
EAST

August 2: Umnak, Dutch Harbor, and Unalaska

Up early (after all this is my birthday). Then breakfast and a long wait for the C.O. in his office. The Chaplain, Sherwood Eliot Wirt, talks with us. He says they have winter winds up to 150 miles per hour; but the temperature does not get below 0°. In winter there is much rain and snow in heavy storms. The vegetation is severely whipped.

After some more waiting the Chaplain suggests that the C.O. is ill; there was a big "party" of some sort the evening before.

I also met Byers, a geologist. He says recent tuffaceous agglomerate caps all the country rock except in the deepest ravines where an old formation of the same general sort, difficult to distinguish from the recent one, is exposed. Since these rocks are porous, there are few ponds and lakes on this island. Over the rocks are deposits of ash and cinders.

Probably through the good office of the Chaplain, word got through for a lieutenant to take care of us. Since the weather is excellent - clear and sunny with very few clouds - we decide to go at once to Dutch Harbor on a small island in a bay by the village of Unalaska on the island of Unalaska.

We leave at 1:35 a.m. in a small 2-motored plane (C-45).[1] Each of us is fitted out with a "May West" and a parachute. Certainly I hope these precautions are unnecessary. If one should drop in the Bering Sea he couldn't last more than a few minutes at the very most on account of the cold.

We fly out toward Unalaska Island over Umnak Pass toward Chernofski Bay. The plane rocks a great deal. The coast line of Unalaska is very irregular and mostly lined with nearly barren rocks. After a few minutes, we head up the coast, keeping over the water and can see little of the land.

We fly around a mountain of 6,680 feet (KA XIV.9 and KA XIV.10). The general slope is gradual, but there are very sharp local slopes. I see several small streams. The lower slopes are green.

Going into Dutch Harbor, the shore line is sharply indented with jagged mountains to the east and south. Snow is on the higher peaks. Except for a few places, where small streams come to the sea, the land is very rough. (Again the plane is very bumpy.)

The main base and air strip are on a hilly island, partly rocky, in the bay. We are down at 11:26 a.m. In

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1/ For some reason, this was the first flight for which we were asked to sign a release from responsibility in case of an accident.

cuts at the margin of the flight strip, there is about 6 feet of well drained, stratified volcanic ash and soil over gray eruptive rocks.

We have an excellent lunch (with silverware, table cloth, and a negro waiter!) with several officers. Former meals on the Chain have had rather rugged self-service for the most part.

Immediately after lunch we go up the slope and I take a soil sample about one mile from the air strip. The site is on a rather strong foot slope, about 6 to 8% (perhaps only about 5% where sample is taken), of a mountain. The soil is well drained and developed from somewhat stratified volcanic ash over eruptive rocks. The area has been disturbed a little, by tramping perhaps, but not significantly. The vegetation is quite luxuriant: cranesbill, wild parsley, blue top grass, carex, poa grass (sp.), Alaska timothy, beach grass, crowberry, blueberry, wild geranium, iris, daisy, and other flowering plants.

This is likely close to the "normal" soil.

Sample No. 57

A_0	3-0	Brown mat of roots, moss, etc. (Probably partially burned not too long ago.)
A_1	0-4"	Brown, mellow, fairly granular silt loam (?) with many roots.
B_1	4-7"	Very dark brown fairly granular silt loam. Some roots. Somewhat platy.
B_{11}	7-16"	Very dark brown granular silt loam. Some roots. Slightly more compact than B_1. Slightly platy.
B_2	16-36"	(varies) Dark brown heavy silt loam. Quite compact in place. Some old roots. Digs out in big chunks, easily friable to imperfect granular. Vesicular.
B_3	36-48"	(Not sampled) Yellowish-brown silt loam, finely mottled with reddish-brown. Vesicular. Rather compact, but removed chunks are fairly easily friable.
C	48-60 +	Slightly reddish, brown loam. Compact in place.

Relicts of old soil layers to be seen in B_3 and C.

We are driven over to Unalaska village (and across a short ferry) built on a narrow bench of alluvial and coastal origin. The population consists of Aleuts, Eskimos, Indians, and native whites. The Greek Orthodox church appears to be in fairly good repair, but there is no priest. At one house I see a small vegetable garden, built up in beds in the Russian manner, with fair lettuce,

KA XIII.10 August 2, 1946
Unalaska. Sitka spruce, planted many years ago by a Russian priest.

KA XIII.11 August 2, 1946
Unalaska, Unalaska. Main street of village.

radishes, parsley, and rhubarb. Raspberries are just blooming. Turnips show nitrogen deficiency. There is a good lawn with some pansies and other flowers in small beds. There are some good chickens.

I photograph some healthy looking Sitka spruce trees set out some 50 or 60 years ago by a Russian priest. It is a pity that more were not planted. These trees have many cones and I pocket a few for Dr. Barnes' collection.

Time is short. I photograph the main street and we go back to the plane. In the air again at 2:00 p.m. Perhaps because of some friendly kidding at the airfield, our pilot swings around and zooms down over the airstrip almost scraping the ground! Then he just dodges a little rocky island in the bay.

We fly out over the interior of Unalaska Island - over rugged mountains and just east of a glacier. In KA XII.12 the glacier appears; just below it is a hot spring. As we circle west toward Chernofski, we cross some low valleys with good green cover. There are relatively few lakes and ponds. Near Chernofski Bay the land is green and gently rolling, like more typical arctic meadow, with ponds, peat, and small native streams in the broad valleys. At 2:34 p.m. we are down again at Glen Field on Umnak.

KA XIII.12 August 2, 1946
Unalaska, near Dutch Harbor. Glacier in background; hot spring in foreground.

A soldier drives us out northeast of the base for some distance. Near the coast is a large peat swamp, backed by an ocean terrace that merges with a broad mountain valley. The dominant soil appears to be a little young and here developed from volcanic ash and cinders. The grass cover is good to excellent. There are many lupines.

As we drive in a westerly direction up the head of the broad valley we see many soil mounds, somewhat elongated and oriented north-south, likely in the direction of strong winds. These are 2 to 4 feet high and about 12 feet across. This valley leads up to a broad interior plateau with excellent cover. The soil appears to be similar to sample number 57 but has been covered recently with a thin layer of volcanic cinders.

I see sedges (carex), lupines, poa (sp.), beach grass, Alaska timothy, equisetum, wild geranium, yarrow, moss, and many other flowering plants. This area should make good pasture. The plain is gently undulating with 2 to 8 mounds per acre.

I take a partial sample and a sample of carex.

Sample No. 58

$A_0 + A_1$	0-3"	Brown peaty surface mixed with cinders. Many roots.
A_3	3-8"	Dark olive-brown gritty, cindery loam.

The old soil beneath from ash resembles No. 57.

We return to the lower terrace and I take a sample on a gently sloping fan near its junction with the coastal plain. Here there are a few low mounds. The soil has been influenced a little by recent light showers of ash and cinders. The area is well drained for the Aleutians. The site represents a large area of good soil, although a little young. Two vegetation samples were taken - lupines and a grass mixture. The vegetation is luxuriant and consists of beach grass, carex, lupines, etc.

KA XV.1 August 2, 1946
Umnak. Fan-like terrace near boundary of coastal plain, looking along the coast. Site of sample No. 59.

KA XV.2 August 2, 1946
Umnak. Fan-like terrace near boundary of coastal plain, looking toward the interior. Site of sample No. 59.

Sample No. 59

A_0	3-0	Brown peaty mat.
A_1	0-6"	Dark brown very fine sandy loam. Some cinders. Many roots.
B_1	6-20"	Very dark brown loose gritty sandy loam.
B_2	20-32"	Dark brown loam. Somewhat compact.
C	32-40" +	Brown gritty loam. Rather compact.

Also I take a large sample of A_1 (0-5") for greenhouse work, with the spade work by Olaf. Roy helps again with the labels.

We return to quarters and go far to the Officers' Club for dinner. After dinner our lieutenant takes us out in his jeep (stopping to change a tire) along the south side of the island. Here I see very long, gently sloping fans from the mountains to the sea on which there is mowable pasture (for hay), except along the several deep trenched streams. Some of these trenches are over 100 feet deep. In them are swift, pretty streams 3 to 8 feet deep and 1 to 3 feet deep. The streams are especially rapid this evening because the sun has been shining on the mountain snow nearly all day. Unusual.

The soil is like No. 58. The deep substratum is mixed ash and alluvial material.

The dark color of old buried A_1 horizons is very persistent, even in deep cuts.

On this side of the island is a thin blanket of recent (1945) cinders of fine gravel size up to small pebbles. But the vegetation is good. A practically complete green mat covers all slopes below the mountains. Snow banks extend down into the green cover a little way.

As we get southwest of the mountain peaks there are more mounds of cinders. At about 6 miles (in a straight line) from the base we turn back. At this point the soil is developed wholly from cinders, yet this place got very little of the recent (December 1945) explosion. 1/

We have a glorious sunset for our return.

A long day, but very interesting. Here we have seen the best grass and the best soil (I think) of any place we visited in the Aleutians. It is said that there are flocks of sheep held by Aleuts on the west end of Umnak and on a ranch near Chernofski on Unalaska. It is too bad we could not visit either place.

I wonder whether the C.O. is yet sober and well.

1/ Don Carrol, U.S.G.S. (Washington) can supply some detailed maps of this region.

August 3: Back to Palmer

We were up early hoping to get back to Palmer. But we must wait. Finally we leave Umnak for Cold Bay at 9:27 a.m. All the way we ride over a cloud bank and within a thin haze. We are down at Cold Bay, under a very low ceiling - the thrilly kind - at 11:10 a.m.

Chances for getting on to Anchorage don't look too good. First yes, then no. We have lunch and take our gear down to the airfield. But a USO troupe is booked to go first. Just a minute before their plane leaves, the pilot says he'll take one more. I go.

The plane leaves at 12:50 p.m. We are immediately over a heavy cloud bank. The USO crowd start out with much singing and nonsense,1/ but soon settle down - a little ill I'm afraid - to doze in silence.

At about 4:50 I get a glimpse of the Valley of Ten Thousand Smokes. Later I get pictures of Augustine (?) and Iliamna Volcanos. Over the Kenai country I see a fine bull moose trotting through the swamp.

1/ They were composing a song about the Aleutians, with combinations of the names of individual islands; but the only agreement was on the last line: "Then pull the Chain."

KA XV. 3 August 3, 1946
Iliamna Bay, Alaska Peninsula.

KA XV.4 August 3, 1946
Iliamna volcano, Alaska Peninsula.

We are down at Fort Richardson at 5:30 p.m. I hurry into a taxi and get out to the main road to hail the 6 o'clock bus from Anchorage to Palmer. The first regular bus is gone and I need to wait for a half hour for the second. About half of the passengers are already drunk, but several go ahead with alternate drinks of beer and whiskey. Both they and the bus are in bad shape when we reach Palmer at 8:00 p.m.

Certainly whiskey, by any reckoning, is the number one problem of Alaska. Hundreds of thousands of dollars are spent for it by people who need other things much more. It very badly affects the natives, especially the Indians, both directly and indirectly. Many an Indian trapper is cheated of his furs when drunk, I have no doubt. They neglect their children and sled dogs. They get pneumonia and tuberculosis - partly because of exposure when drunk. Indian girls get venereal disease into the native communities. And so on. But there is so much money in it for so many people. I see no way out but a strict Territorial monopoly where no one is allowed a profit from the liquor trade with low prices to discourage bootlegging.

I have a late dinner with Iver and ask about the SCS maps. Anderson didn't send them. These maps are so hard to get one wonders whether they exist at all!

This trip to the Aleutians fulfilled for me an ambition of many years. For so long I've heard of the dense grass over all of them. Here and there I did see grass but chiefly the cover is dwarf shrubs and moss. And no two of the islands I saw are alike.

But it seems a great pity that these islands could not be studied properly by a soil scientist with adequate transportation, as and when needed, not continually in a desperate hurry fitting in where he can. I wonder why it is so hard to get scientific work done properly amidst such obvious plenty when the results are basic to enormous undertakings that are being established?

But now I need sleep badly.

(The following is a brief statement on the soils of the Aleutians for part of a report to the Chief of Staff at Fort Richardson.)

Soils of Aleutian Islands

Although generally moist, dark-colored, covered with a peaty surface, and developed from volcanic rocks or ejecta, the soils vary a great deal in: (1) slope, (2) drainage, (3) depth of peaty covering, (4) content of organic matter, (5) depth of fine material over gravel or rock, and (6) permeability. All of these greatly influence their potential use.

Although some may be useful for hay, strongly sloping soils, wet soils, those with more than 1 foot of peat, very sandy soils, soils with seepy spots, and soils shallow over coarse gravel or rock should be avoided for all vegetable crops. Those selected for use should be well drained, gently sloping, near sea level but free from flooding, and in places protected from strong winds as much as possible. Fertilizers will be needed for vegetables.

Cold Bay. No soils were seen suited to hay or pasture. In well-drained protected sites with a gentle slope, a small garden might succeed; yet the prospects are not good.

Adak. Near the foot slopes of Mt. Moffett, where the rifle range is located, is an alluvial valley that could rather easily be drained sufficiently for a hay meadow of considerable size. Pastures on the natural slopes are fair. Likely a dairy herd of 15 to 20 cows could be supported in this area.

On sloping soils having dark-colored surface soil and less than one foot of peaty surface, vegetable crops could likely be grown.

Amchitka. No soils were seen significantly suited to hay or pasture. Some well-drained soils with less than one foot of peat may be found for a small garden. But the area is not promising.

Shemya. No soils were seen significantly suited to hay or pasture. Narrow strips of well-drained soils between the peat swamps of the interior and the cliffs or sand dunes near the sea might be used for vegetables. They would need protection from wind. Only small areas are available.

The soil of the Aleut kitchen middens would be excellent, especially for use in greenhouses. Local sea weed could be used as a source of potash.

Umnak. Large areas here are available for vegetable gardens and hay meadows. For vegetables, the gently sloping well-drained land of the most protected places on the lower slopes should be used. At the higher elevations, the soil is too cold for vegetables but suitable for hay and pasture. Very little effort would be required to place several huhdred to two thousand acres near the base in shape to mow for hay.

Dutch Harbor. Near the base is good soil for gardening. Much of it is too strongly sloping and only the most smooth-lying, well-drained, deep soil should be used. Care must be taken to protect gardens on the lower slopes from wash from above by diversion terraces at a slight angle to the contour or other appropriate means.

At a distance, some suitable land was seen on Unalaska, near the base and toward the west end of the island, near Chernofski Bay.

Other islands, like Tonaga and Atka may be expected to have suitable soil but these were not seen.

Fertilizers will unquestionably be required for vegetables and possibly for good quality hay. Nitrate fertilizers are almost certainly needed for good early growth; and likely phosphate and possibly potash would be

needed. Something more specific can be said after soil and grass samples have been examined in the laboratory. Small pot experiments with a large soil sample taken at Umnak will also be helpful. Lime may possibly be needed: the matter is entirely uncertain until the samples of soil are studied.

Soil blowing on Shemya can be controlled by transplanting beach grass on critical areas, spacing them 18" x 18". Some mulch of hay or peat, held down by old fish nets, would be helpful where seedings are attempted with grasses, such as brome and rye mixtures.

Trees may be planted on well-drained protected sites, even on quite sandy soils, if set out very carefully and the soil kept covered with a 2 or 3-inch layer of moss and peat. They should be given a cupful of mixed fertilizer, like a 5-10-5, well mixed with the soil, when set out in the spring. Grass and other plants should be kept out in a space about 18" from each tree while they are small and just getting started.

August 4: Sunday in Palmer

In the morning Iver and I study the Aleutian samples and lay them out to dry. I hope these get back safely; already they have cost a lot of effort (and some backache).

At noon several of us, along with Mr. Gasser, go out to Don Irwin's farm home for dinner, and a splendid chicken dinner in the American rural tradition it is.

Don Irwin tells me, what I had already guessed, that visitors to the Matanuska Valley are suspect. They have seen many "missions", "scientific parties", and so on, from several Governmental agencies but little ever comes from them - except newspaper articles and books in the United States based on hurried "windshield" surveys. Then they've had many reporters who exaggerate one way or the other about the Valley and the prospects for the future.

Both Irwin and Gasser agree, and emphasize, that much of the sentimental ballyhoo about Alaska, encouraging people to come, is bad. People should know what the real conditions and handicaps are before hand. They should have capital to start farming - not one cent less than $5,000 and better still if they have $15,000. They should come and stay for awhile, and look around a bit, before bringing a family or burning their bridges behind them. For

many people Alaska offers new and good opportunity; for many others it would mean unhappiness, disillusionment, and bitterness.

Not much is known about lime - even less than about fertilizers. Iver and I agree to look at a marl deposit near Wasilla Lake.

We all agree that the increasing problem of weeds must be met somehow. Mechanical and chemical means must be found. Much of the land is already foul with weed seed.

This problem and the one of organic matter would be helped by a good legume, like red clover, in the rotation.

Mr. Irwin promises to call Mr. Anderson's office in the morning about the SCS maps.

Mr. Gasser and I spend the evening talking about his long experience in the University, the policies of the University, especially as they affect agricultural research, and similar matters. His judgment deserves careful consideration I'm sure.

August 5: Near Palmer and Wasilla

Dr. Nygard, Mr. Gasser, Mr. Edgar, and I drive west of Palmer to examine a marl deposit by Wasilla Lake, near Trent's place on the main road to Wasilla. It occurs in a rather open grassy swamp of blue top, carex, small willows, and moss near a stream at the margin of a lake. We can see that some marl has been taken from the bed of the stream.

The surface is well covered with a thin layer of moss, partly sphagnum, at one time partially burned.

1. 0-5 " Very dark brown loose mat of roots and fibrous peat.

2. 5-10" Dark grayish-brown fibrous and sedimentary peat.

3. 10-48" Dark brown somewhat decomposed fibrous peat with remains also of reeds and wood and small lenses of moss peat. (Frozen between 18 and 22 inches) (water table at 20 inches in hole

4. 48-60 + Slightly brownish, gray marl.

Sample No. 40 (Marl here between 48 and 60 inches)

With this much overburden, it would be expensive to take out the marl. Perhaps some could be gotten easier in the lake bottom.

About 4 miles southeast of Wasilla we come upon a large area of fairly well drained nearly black mucky peat,

KA XV.5 August 5, 1946
Near Wasilla Lake. Area with marl at 4 feet under peat.

KA XV.6 August 5, 1946
Near Wasilla Lake. Area with marl.

mainly from wood. This well decomposed material would be excellent for use as a soil conditioner or in compost. The area is near a stream that has apparently deepened its channel to give better drainage than normal for the peat. In a place once cleared and cropped, some peat has already been removed for use.

Sample No. 41. We take samples of this peat at 18" and at 30".

In this area of well decomposed peat, frost is found at 3 to 5 feet. A few feet away under the natural cover of spruce, dwarf birch, cranberry, moss, etc., the frost is found at 12 to 18 inches.

Back to Palmer for lunch.

After lunch we visit the Thompson farm about a mile west of the McAllister place (NE¼ Sec. 31, T18N, R2E).

Mr. Thompson came from Minnesota and homesteaded in 1934. He has had practically nothing to do with the Colony, nor does he belong to the Coop. He now has about 34 cleared acres. In addition to himself, he uses 2 hired men, most of the time since May 15, and 2 stepsons during the summer between school terms. The farm has a splendid setting with woods north, south, and west. (KA XV.8) and a beautiful view across the Valley to Knik Glacier.

Beyond the strip of woods to the south is another long narrow field.

The soil is similar to that described on Mr. Johanson's place. It is undulating, with only a little of the billowy surface, well drained, and deep to gravel (about 5½'). See picture KA XV.10 for the profile in a fresh excavation, slightly disturbed at the surface. There is evidence of both wind and water sorting and layers of organic matter, mainly rotten wood, in depth. The picture shows such a layer prominently at 29 inches. The adjacent original forest is a dense mixture of spruce, white birch, etc.

I look at the soil in the vegetable garden on a slope of about 1½% (far center of KA XV.7).

A_p	0-6"	Dark gray very fine sandy loam with mellow crumb structure.
A_3	6-13"	Grayish-brown very fine sandy loam, mottled with yellowish-brown and dark brown (organic). Slightly compact but digs out in easily friable chunks.
G_1	13-27"	Mottled gray and brown very fine sandy loam. Slightly compact but easily friable.
G_2	27-36" +	Mottled gray and yellowish-brown very fine sandy loam. Compact in place but easily friable when removed.
D	About 66"	Water-sorted cobbles and gravel.

KA XV.7 August 5, 1946
Thompson farm, west of Palmer.
Part of vegetable field, with house.

KA XV.8 August 5, 1946
Thompson farm, west of Palmer
View over wheat. Knik glacier in far center.

At the present time he has about 8 acres of oats (Gopfer) and wheat (Siberian) for grain, about 2 acres of cabbage, 1 acre of carrots (Corliss, Chanteney, and Nantes), 1/5 to 1/4 acre of celery (Utah), 5½ acres of (Michigan Improved Green Mountain) potatoes[1], about 5 acres of lettuce, besides significant amounts of cauliflower, brussels sprouts, peas (very nice), beets, and turnips.

As usual, cabbage and celery plants are started in the greenhouse and followed by tomatoes and cucumbers. He also grows a few watermelons in the greenhouse.

All of the crops appear to be in excellent condition. He emphasizes the need of getting crops in early.

All vegetables are fertilized. On the lettuce he uses about 100 pounds per acre of 5-6-6 followed by a side dress of Trail ammonium phosphate at about 100 pounds per acre. On the potatoes he uses 400 pounds of an uncertain mixture.

The celery now looks especially good. The village water supply line goes across his place. For the

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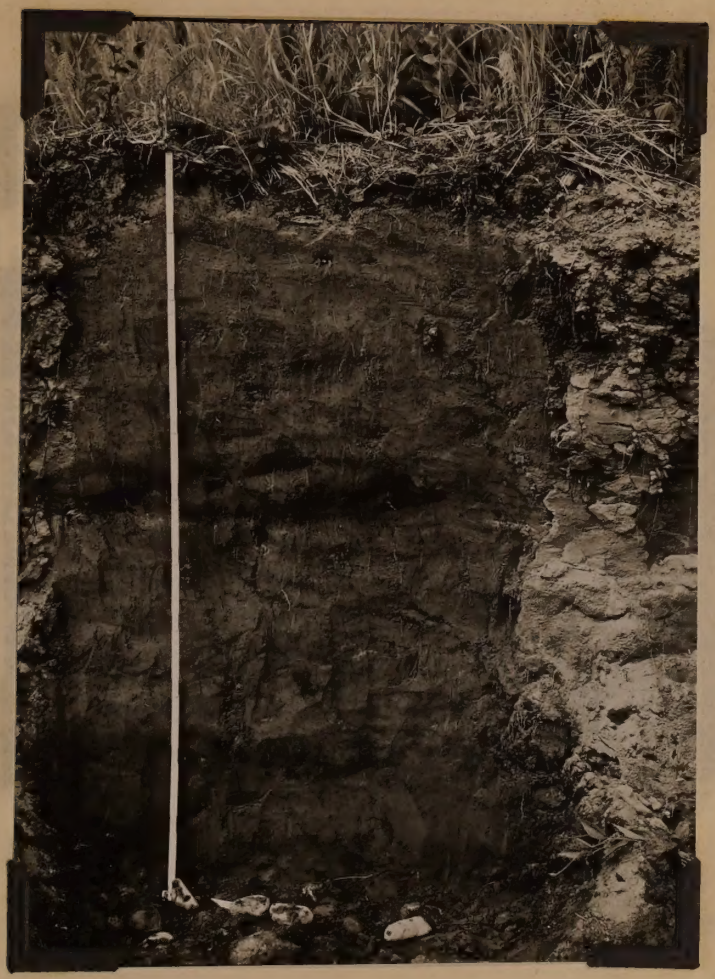
1/ One rarely hears this word in Alaska. Potatoes are universally called "spuds" by everyone. Many small farm children could not be expected to understand "potato."



KA XV.10 August 5, 1946
Thompson farm, west of Palmer. Soil profile of the best agricultural soil type in the Matanuska Valley.

FIG. IV-10 August 5, 1946
Thompson Farm, west of Palmer. Soil profile of the best agricultural soil type in the Matanuska Valley.

KA XV 11. August 5, 1946
Thompson farm, west of Palmer
Michigan Improved Green Mountain potatoes.

right-o-way he has the right to irrigate about two acres annually. A very good deal! The crop has already been irrigated by sprinkler several times. He keeps the soil moist. The plants are 6" apart in 40" rows. He confidently expects bunches of 2 pounds or better to sell for at least 25¢ per pound. He has about 5,000 plants and I've never seen better ones of Utah celery. The crop has been fertilized very heavily. First he plowed under a heavy dressing of chicken manure. On this area of 1/5 to 1/4 acre, he then used a mixture of 200 pounds of nitrate of soda, 200 pounds of 48% superphosphate, and 100 pounds of muriate of potash, applied broadcast, and later a mixture of 100 pounds of double superphosphate and 100 pounds of ammonium nitrate in <u>each</u> of two side dressings!

Although he came from a dairy farm and expected to start one here, Mr. Thompson changed his plans to grow vegetables and chickens. He raises all the "scratch" for his chickens but buys the mash.

Certainly this farmer is highly successful. He is obviously alert and a good observer. He is careful about weeds and hasn't let them get out of hand as so many farmers here. All work is done with truck and tractor. He only lets products of high quality off his place. He gets high prices directly from Anchorage merchants. Likely he has

a gross income of 12 to 15 thousand dollars and a net of 6 to 8 thousand. He has fine equipment and intends to build a new house soon.

He doesn't belong to the Coop because, he says, the Coop doesn't grade the products closely enough and mixes vegetables of poor quality with good products from the better farms. This may be true. Probably such a man does not need the Coop. Yet were it not for the Coop, I doubt that he could sell his products so well.

This evening the SCS maps came to us by bus. At last![1/]

Aamodt, Magruder, and Orr came in from the Aleutians after a rest (?) at Cold Bay.

1/ In Washington, just before these notes were typed, I received a copy of the printed report; but the soil descriptions are altogether inadequate for soil classification or other soil research, or as a basis for individual farm recommendations.

August 6: Matanuska Agricultural Experiment Station and Palmer

With Dr. Nygard, Mr. Gasser, and Dr. Magruder I drive to the Experiment Station. The agronomist is seriously ill and I will not attempt to go over that work in detail. Magruder puts a few strawberry plants, collected at Umnak, in the greenhouse. Near the greenhouse I see some small experimental plantings of currants and crab apples. These are so chocked with grass that they scarcely have had a chance. The apples show an advanced stage of nitrogen deficiency. Failure of such plantings could be easily misinterpreted; with such care they would likely die anywhere.

I look at the soil about 75 feet west of the road through the station, nearly opposite the main entrance. The soil is on a bench-like position, relatively high, and well drained.

A_p	0-9"	Grayish-brown very fine sandy loam. Easily friable to soft crumb structure.
G-B	9-16"	Mottled light olive-gray, moderate brown, and yellowish-brown very fine sandy loam. Somewhat laminated and somewhat compact in place, but easily friable to soft crumb.
C	16-22"	As above, but much larger percentage of brown color. Well laminated.
D	22"+	Yellowish-brown water-sorted sand, gravel, and cobbles.

Thus the soil is shallower to gravel, contains less organic matter, and is not soo good as that at Palmer, on the Thompson, Anderson, Folk, McAllister, Johanson, and Nelson farms, or on the Sherrard farm, except for the fine sandy soil near the river bluffs.

Dr. Nygard and I take 2 composite samples from the north and south sides, respectively, of the oats-barley-pea hay field west of the small experimental plots. The crop is very uneven. (Nygard takes the north side, I take the south.) Weeds are thick in the field, as in nearly all grain and hay fields in the Valley, especially lamb's quarter.

Today we have with us the SCS map. First of all I notice the Experiment Station is shown as a cemetery! (Error or someone's sense of humor?) The soils, both on smooth terraces or benches and on very steep gravelly escarpments, are shown in one series - Knik!! An attempt was made to separate these two unlike soils by slope symbols! Of course, the soils are entirely unlike; in the latter the entire solum is developed from the coarse gravel, and obviously belongs in a different soil series. Yet the boundary lines of the slope "phases" are not drawn accurately enough here to be taken as soil boundaries.

KA XV.12 August 6, 1946
Matanuska Agricultural Experiment Station
from the west.

Fig. 12. August 6, 1946
Matanuska Agricultural Experiment Station
From the west.

On the station, boundaries are shown between a Knik and a Knik, shallow phase. Since these could not be seen or identified on the ground, the basis for the distinction is entirely obscure.

Further, the distinction between Knik and Bodenburg is obscure. On the way back to Palmer, soil mapped Bodenburg is found to be 30" deep over gravel. Apparently this is included with that 5 and 6 feet over gravel.

Perhaps the greatest error in classification, from a purely practical standpoint, is in slope. The A-slope class has a range of 0-7% slope in the legend (actually more in mapping), which entirely ignores a critical line on the Bodenburg and Knik soils around 3 or 3½% slope. By ignoring this critical boundary a large amount of hard mapping work on the better soils was avoided; but it makes a great difference whether the soil is in the lower part of this wide range or in the upper; and especially as regards both soil blowing hazard and erosion hazard. In the areas of better soil there are many rather short slopes of 3 to 10%, not shown, that offer relatively important hazards unless carefully managed. Thus the maps appear to be inadequate for advising farmers regarding erosion control practices.

Another great deficiency of these maps is the failure to indicate section lines. There are too few roads for

control so without section lines it is impossible for the map user to locate himself on the map accurately. Even if the classification and mapping were accurate, this lack of control would make the use of the maps difficult in most places and especially difficult in uncleared, undeveloped areas of interest to prospective settlers.

Dr. Nygard will attempt to find the time for further spot checks of the mapping, correlation, and nomenclature to see more definitely what use can be made of the map.

On the whole, evidence of serious soil blowing and erosion is lacking, except for soil blowing on the higher sandy soils near the river bluffs and both blowing and erosion on the short steep slopes of the billowy mounds, where exposed and poorly managed. As more land is cleared, however, the soil blowing problem may increase if land clearing increases the sweep of the winds. It is hoped that strips of trees will be left as wind breaks. Further, as the supply of organic matter in the soil diminishes blowing and washing will increase some. Bare steep slopes are bound to wash in the spring before the lower soil is completely thawed. This problem is not serious now but could become so. Any soil survey of this area should indicate the slopes where this hazard exists, say around

3 to 5% depending on the soil type, in great detail. Some say there is already much blowing; but the evidence for it does not exist except under the specific conditions mentioned above. But the hazard is there in the path of the winter winds off the Matanuska River and the spring winds off the Knik glacier. On the good soil, really adapted to successful farming, the erosion problem is easily manageable.

Of much greater importance than erosion are the problems of weeds, maintenance of organic matter, and proper fertilization.

It is a great pity that so much organic matter has been destroyed in land clearing with deeply set bulldozer blades. Of course, by setting the bulldozer blades deeply there are less roots to remove by hand, but much surface soil is wasted. Once the organic matter is lost, it is very difficult to restore it by any practices now used by farmers.

Back to Palmer for a late lunch. I pack up my exposed film and send it to Washington. I ran short by a few pack for the last few days.

Along with many other people I have a "shot" for diphtheria. The epidemic is serious in Anchorage and all necessary precautions are being taken to prevent one in

Palmer. Hundreds of farm people are coming in for shots. I may need a certificate to get out of the area. We had planned a meeting with farmers here as we had in Fairbanks, and it is a great pity that it must be cancelled.

Further, I had planned to spend another half-day in the part-time farming area near Anchorage; but it now appears impractical to go there because of the regulations. Too bad.

Mr. Harris, manager of the Coop, asks me how to get some Federal "subsidy" in a way that the Coop would have a standing as a Government agency. With such a standing, they could deal directly with the Alaska Railroad and avoid competing with other bidders in the sale of agricultural products to the railroad. He says a lone farmer can now bid so low that he can wreck their necessary price scale, although ultimately he would fail to furnish the agreed amounts of high quality products. This question is too much for me and I suggest that he write to the Secretary. Orr agrees to discuss it with him.

In the evening Mr. Klem, a vegetable farmer near Palmer, calls for a talk. He has read a great deal about nutrient deficiencies and speculated about his soil conditions. Apparently he is a good farmer but has some

failures. He has had deficiency symptoms on rutabagas, cabbage, cauliflower, celery, and other crops. Could it be boron? Manganese? Magnesium? Where plants are grown on the old windrow burns he gets no such troubles and the crops grow luxuriantly. Is it wholly the ash? Or partly the deeper surface soil? He has gotten good results from applying ashes.

He uses a lot of manure that he buys cheaply from dairy farmers, who should use it themselves but who do not realize its great value on their own farms.

He asks about hauling the clay from the tidal marshes which contains considerable potash, on to his land. I suggest it would be impractical. He asks about applying granite rock, pulverized in a hammer mill. Same reply. He suggests that dolomite is available near the crossing of the Little Susitna River and the Palmer-Willow road. This might be beneficial. Also marl. But I point out that the value of these materials must be tested in careful experiments.

He says that when he cuts trees there are clouds of dust from them, dust which had settled out of the air - glacial flour blown out of the bottoms of the Matanuska River. A rusty saw will become shiny in a very short time!

Mr. Klem says that many clovers and other perennial plants winter kill on most parts of his fields due to alternate thaws and freezes and to strong winds that blow away the snow cover from exposed places.

Cover crops have the disadvantage of delaying thawing of the soil in spring and consequently delaying preparing seed beds and planting. Thus the advantage of cover crops, in his opinion, might be more than offset by the losses due to late planting.

He thinks that soil blowing, in exposed places, may be as much as 2 inches per year. I doubt this would be general and suspect it is confined to the exposed shoulders of the low billowy mounds discussed already today in these notes. Every year, he says the plow brings up old wood and little sticks. This is to be expected because of the enormous changes in volume weight in the soil, brought about by cultivation. I should expect the soil to increase in volume weight over a period of 5 to 10 years as a normal phenomenon.

And so late to bed.

August 7: Preparing to leave Alaska

During the forenoon I pack up my equipment. Some I mail home, along with the Tundra samples. The cameras are turned over to Iver. Even then the baggage is very tight.

To be on the safe side, the local physician gives me a certificate indicating good health. An article in the newspaper indicates that very strict regulations will go in effect at midnight, August 8, on account of the diphtheria.

Ellis and I leave Palmer on the 4 o'clock bus for Anchorage.

Generally, the soils along this highway, although quite variable, are unsuited to crops. The road is on gravelly and cobbly river terraces for some distance, especially near Palmer. It passes over colluvial-alluvial fans, some glacial till, and glacial terraces. In places the soils have shallow but conspicuous Podzol solums.

We reach Anchorage about 6:10 p.m., check over plane reservations, have dinner, and go to bed early.

August 8: Anchorage to Seattle

We are up early and taxi to the airfield at Fort Richardson. The office of the Alaska Airlines at the field is very sleepy. We leave at 6:25 and are soon served breakfast on the plane.

Although quite cloudy, we can see the land - mostly mountains and glaciers. There are many more small glaciers than shown on the flight map. We fly over Hinchinbrook Island, which has a cover of about 2/3 trees and 1/3 grass and shrubs in a park-like distribution. On the borders are some low, open, marine terraces. I see only a very few signs of occupancy except for a CAA station.

About 7:40 a.m. we come into Cordova. The airstrip is located on a low, wet delta from glacial streams; it is largely open, but with trees near the airport and toward the north. The Chugach Mountains north and east of Cordova are beautiful indeed. At 7:50 a.m. we are again in the air out of Cordova.

The Copper River has a large, swampy delta with many lakes and ponds.

Back of Cape Yakataga, and east, the mountain peaks are almost wholly covered with deep snow and are very beautiful in the sunlight. On either side of Yakataga,

ELMENDORF
Elmendorf Tower
RBN
W-201
DF/WX
Range IR-356
7500
MERRILL
Merrill Tower
KFQD
790
ANCHORAGE
CAMPBELL CREEK
GOOSE BAY
WILLOW
BIRCHWOOD
SPENARD
GREENLAND
ANCHORAGE RADIO
HO-338
KENAI RADIO
KENAI
Turnagain Arm
Cook Inlet
Knik Arm
Point Possession
Eklutna Lake
George Lake
Eagle River
Palmer
Wasilla
Matanuska
Sutton
Jonesville
Moose Creek
Willow Creek
Nancy Lake
Houston
Roadhouse
Susitna River
Susitna
Knik River
Eklutna
Chickaloon Bay
Chickaloon River
Moose Point
Hope
Sunrise
Resurrection Creek
Gilpatrick
Moose Pass
Coopers Landing
Lawing
Primrose
Kenai Lake
Skilak Lake
Resurrection River
Kenai River
Woodrow
Salamatof
Kasilof
Girdwood
Indian
Portage
Whittier
Passage Canal
Blackstone Bay
Wells Passage
Port Wells
Harriman Fiord
Barry Arm
Esther Passage
Eaglek Bay
Golden
Kimiklik
Perry Island
Prince William Sound
Port Nellie Juan
Knight Island
Chenega
Ivy Bay
Whale Bay
Dangerous Passage
Bainbridge Passage
Bainbridge Island
Evans Island
Latouche Passage
CROWN PEAK
MOUNT GOODE
MOUNT GANNETT
MOUNT SANFORD
MOUNT MARCUS BAKER
MT WITHERS
Harvard Glacier
Marvine Glacier
College Fiord
Unakwik Inlet
UNSURVEYED
RJ-269
To Skwentna
151°
150°
149°
148°
60°
61°
62°
26°E
Statute Miles
Statute Miles

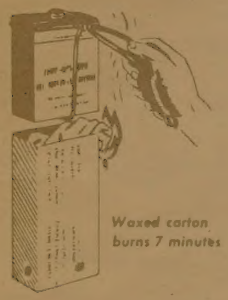
or rope for suspension or stack a number of poles in Indian-tepee fashion. With ventilation at top you can build a fire inside.

LTER

ntal stabil- e cloth, can- side walls. hold down e airplane is

ered country get dry wood from vergreens. Green wood will burn rom driftwood along beaches and ng valleys and in other sheltered edded peat, heat tablets and gas e heather, a low spreading ever- nches high and the resinous wood

ing gasoline, oil and fats. See ing 100-octane gas. Never add never burn potential foodstuffs,



Waxed carton burns 7 minutes

Ration carton "stove"

arge will ration food immediately. ss native foods are plentiful. If trated food for camping. One an per day easily will keep you owever when traveling you will e are desirable.

ve foods in the north are safe to cially in winter, is not easy. You or small game than it will yield if ons if you have them; concentrate rk on your signals.

nings, rabbits, squirrels, muskrats r game. Set snares or deadfalls nge them so animals can't avoid ral as possible. Porcupines can fresh cuttings in the bark of hunt game successfully; take it Among the large game are the ered country and on marsh shores through timber and over tundra;

d ptarmigan are abundant. Both talk and shoot. They also can be In summer, waterfowl can be

ood. They are plentiful in the trapped, netted or speared. In ost anything will serve as bait, f tin or bits of cloth. Improvise d lines. Make spears, build fish atch more fish than you can eat at

Cross glacier-fed streams in the early morning when they are lowest. Summer travel is easiest by water; use the airplane raft if available or make one out of logs. If descending a river by raft, watch for signs of rapids, falls, "sweepers" (undermined tree at right angles to bank; branches sweep water) and partly submerged rocks. Portage dangerous places. If danger is suspected, explore ahead on foot. In fast water or over rapids, rafts can be let downstream by means of ropes handled from the banks.

IN WINTER. The major obstacles to travel will be soft deep snow, dangerous river ice, severe cold weather and a scarcity of native foods. If the snow is deep, don't try to travel without snowshoes; you may be able to improvise a pair from boughs with chute shroud lines as webbing or from metal panels of airplane. Don't travel in a snowstorm or extremely cold windy weather. Hole up and save your strength. Be careful of recent overflows along streams. They are covered only by thin ice and snow. Rope men together when crossing dangerous river ice; on thin ice distribute your weight by lying flat and crawling across. Young ice is unreliable; ice over rapids usually is thin. If you break through the ice, get under shelter at once, build a fire and get out of wet clothing.

IN THE MOUNTAINS. On glaciers be careful of snow-bridged crevasses. Try to travel on glaciers in groups of not less than 3 men, roped together at intervals of 30 to 40 feet. Use an ice axe or stout stick to poke for crevasses and as an aid to travel. Sometimes it is best to travel on ridges where the snow may be firmer and you have a better view of your route.

CHOOSING A ROUTE. Throughout the area covered by this chart, most routes should be chosen to lead you to: (1) a highway or the Alaska Railroad; (2) some known point of habitation; (3) a major river such as the Copper, Sustina or Chitina; (4) the sea coast. Travel down a stream or along the sea coast generally will lead you to a trail, cache, cabin or settlement. If your objective is on a road, a stream or the coast, plot your course to intersect this feature well to the right or left of the objective so you will know which way to turn when you come to the road, stream or coast. Always take the safest route even though it may be longer. Avoid obstacles that will use up your energy. Use topography to advantage. Travel *with* the drainage lines, not across them; this rule applies especially in summer. However, it is sometimes better to stay up high and go around the head of a valley, especially when its floor contains muskeg or swamp.

Keep calm. Conserve water and food by saving energy. Don't shout unnecessarily. Don't move around any more than you have to—life rafts capsize easily. Plan your course of action carefully.

Thereafter

To enable your rescuers to home on your position take turns using the Gibson Girl at five minute intervals as well as during the International Silent Period. All Navy and Coast Guard stations and some Army stations monitor the International Distress Frequencies during the "Silent Period" which lasts for three minutes beginning at 15 and 45 minutes after the hour. Wait until you are sure you will be seen before using flares or Very pistol; use sea marker in daytime; don't waste these signals. Use the signal mirror constantly; if no rescuers are in sight, flash it at the horizon.

If winds and currents are favorable, rig a sail. If unfavorable or in rough weather put out sea anchor on a long line; adjust length of line so that when raft is at crest of one wave, the sea anchor will stay in a trough.

Maintain a lookout at all times. To prevent loss of raft if upset by a wave, always keep it lashed to man on watch with at least a 10-foot line.

Balance raft properly. All men should remain seated; the heaviest man should be placed in the center. Never make sudden movements or stand up without warning the other men. In rough weather, sit low in the raft and distribute weight to hold weather side down.

If you get seasick, don't eat or drink. Lie down and change position of head.

Take gentle exercise to relieve cramp and numbness. Exercise toes and feet. Elevate feet and legs for 15 or 20 minutes during the day.

Try to rest as much as you can. When not resting, keep occupied with raft duties. Stop worrying—your chances of being picked up are good.

Additional detailed information on sea survival and health on land is available in AAF Manual 64-0-1 "Survival" (formerly AAF Manual 21), packed in most emergency kits and rafts. Also look for AAF Manual 60-1, "Emergency Uses of the Parachute", packed in the pocket on the outside back of your parachute which contains the "Parachute Log Record", AAF Form 46.

Emergency advice prepared by Arctic, Desert and Tropic Branch, AAF Tactical Center, Orlando, Fla.

FC 10

Anchor
Coat

VALDEZ
Port Valdez
Valdez Arm
Columbia Glacier
THOMPSON PASS
Tasnuna River
Lowe River
Wortmanns
Cabin
WAXELL RIDGE
MOUNT STELLER 10000
Allen Glacier
Miles Glacier
Miles Lake
Martin River Glacier
Martin River
CHUGACH MOUNTAINS
MOUNT WILLIAMS
MOUNT DENSON
CORDOVA PEAK
CORDOVA NO 2
CORDOVA
Eyak Lake
Nelson
Alaganik
RAGGED MOUNTAIN
Bering Lake
BERING GLACIER
Port Gravina
Gravina Point
Sheep
Goose Island Fl
Naked Island
Smith Island
Johnstone
HAWKINS ISLAND
Egg Islands
Hinchinbrook Island
Seal Island
Montague Point
Zaikof Fl
Entrance
Fl Cape Hinchinbrook
Green Island
MONTAGUE ISLAND
Kinchinbrook
Nuchek
Katalla
Controller Bay
Cabin Island
Okalee Channel
Wingham Island
Kayak
Kayak Island
Cape Suckling
Gp Fl
Bligh Island
Port Fidalgo
Ellamar
Tatitlek
Columbia Bay
Orca Inlet
Rocky Creek
Cabin
AMBER NO 1
CORDOVA NO 1
CORDOVA RADIO KA-362
CAPE HINCHINBROOK Rbn K-292
CAPE ST ELIAS Rbn O-286
DUTCH ISLAND DO-278
FU-278
265°
258°
355°
358°
GULF OF
147°
146°
145°
144°
28°E
120
130
140
150
160
170
180
190
200
210
220
230
240
250
260
270

NAUTICAL SYMBOLS

H—MEKNES 216 S M →

← 233° MAG

74 (TWEEN CHECK POINTS) 34

CP 116

(CHECK POINT INDICATION)

(traffic controlled) (traffic uncontrolled)

200 (Numerals give mileage along axis of airway)

N A

95° 275°

A N

(BEARINGS ARE MAGNETIC AT THE STATION)

WHITEHALL RADIO
WW-380

RANGE/PN-347

DF
ALGOA KEOB

Rbn
HAFUN KEA

⊙ DF
⊙ Rbn

IVE LOCATION
SYMBOL)

Dante ISP

ACCRA
200 LF
Accra Tower-356 Rbn/AA-380
DF/WXKJ-6530 Range/AA-275

NCY)

KEBB
1280

Cook Inlet Lowland

At the head of Cook Inlet is a wide, lake-dotted swamp area, passing inland to broad rolling lowlands, broken by smooth rounded hills and ridges that seldom exceed 200 to 300 feet elevation. This area is heavily timbered and has much undergrowth, but it is interspersed with grassy or brushy meadows and open marshes. Because of heavy undergrowth and swamps, foot travel in summer is difficult. The best routes lie along the slopes. The heavy vegetation conceals ground signals from the air unless signals are placed in open spaces. In this country, game is abundant. Small game includes rabbits, porcupine, ground squirrel, ptarmigan, and grouse. There is much air traffic in this region. Stay with your plane and you will be spotted.

GENERAL SURVIVAL ADVICE

Immediate Action After Landing

Get out of airplane quickly. Take along chute, warm clothing and other portable equipment, if it doesn't slow your exit.

Stay away from airplane until engines have cooled and danger of fire has passed.

Check injuries. Give first aid. Keep injured men WARM.

Prepare signaling devices and have ready for immediate use.

Avoid frostbite. Keep snow out of your boots. Keep your mitts on. Get out of the wind. *Keep your feet dry.*

Build a fire at safe distance from airplane. Relax; have a smoke. Take stock of your situation calmly. Plan a practical course of action.

Officer-in-charge will assign duties.

In winter, if airplane is still flyable, drain oil, insulate wheels from ice with boughs or other materials, anchor airplane securely, leave brakes off.

Get regular and emergency radios working. Try to keep one engine in working order to generate power for radio.

Prepare shelter. In the northern winter you can live longer without food than without shelter.

Collect wood, gasoline, oil, lichens, or heather for fuel.

Check emergency equipment—see what you have to live with.

Check guns and have them ready in case game is sighted.

Examine surroundings. Think back over the flight, look for landmarks and try to locate your position on the chart.

Start a log book for future reference.

Don't overexert in extreme cold. Sweating is dangerous because it leads to freezing.

Obviously, some of this advice does not apply in summer. Problems then are much simpler, although insects may be a nuisance.

Signals

Since the best practice in this area generally is to stay with your airplane, you must depend heavily on signaling to attract rescuers. Use all of the devices you have available.

Begin using aircraft radio at once, if operative. Don't waste battery on long transmissions. Try to get a fix and transmit your position. Gibson Girl antenna sent aloft and used with liaison transmitter will improve transmission. Use Gibson Girl during the 3-minute International Silent Period, which starts 15 and 45 minutes after the hour, or when an airplane is heard or sighted, or when conditions are such that you are sure a search is in progress. Where open water is not available for grounding Gibson Girl, attach spare antenna to ground lead and lay it out as a counterpoise to improve transmission range. Crank steadily so rescuers can get accurate bearings. If feasible, when you leave the airplane, take the Gibson Girl with you and transmit during the Silent Period whenever possible.

In winter, find an open space and tramp out a big SOS in the snow. Make the letters at least 100 feet high; if you can, outline them with evergreen boughs to make them look dark.

In open country, spread the signal panel on the ground. In timbered country fly it from a long pole lashed to the top of the tallest tree. If you have no panel, make signal flags from chute cloth. The Gibson Girl balloon or kite antenna also can be raised above the trees as signals.

White smoke makes a good daytime signal against bare ground and evergreen trees. Make a dense white smoke by adding green boughs and moss to your fire. Use black smoke on snowy ground; add engine oil, oil-soaked rags, pieces of rubber matting or electrical insulation to your fire. Build your smoke fire in an open place; in timber, smoke must rise above treetops to be seen. Keep a small fire going all the time and have plenty of dry wood and smoke-producing material ready for use the minute you hear an airplane.

In daytime, your signaling mirror is very effective. Practice using it. Even after you've been spotted, keep on signaling as long as an airplane is in sight. At night, when you hear an airplane, point your flashlight at it and SOS. Wait a few seconds and then repeat, but don't wait until the airplane has passed. If available, use flares and Very pistol at night, but don't waste them—use only when airplanes are heard or sighted.

WING SH

Use wing or hor
izer as roof. Use ch
vas or snowblocks
Stake down edges
with rocks. Be sure
well anchored.

Heat

FUEL FOR FIREMAKING. In timl
dead standing trees or the lower limbs of
if split fine. In timberless areas, get fuel
rivers and from scrub bushes growing a
places. Dry lichens, moss, dried and sh
and oil all make good fuel. Look for whi
green plant in the tundra; it grows 4 to 12
burns well both green and dry.

STOVES. Improvise stoves for bur
illustrations. Use great care when bur
gasoline to a burning fire. If food is scarc
such as fats and hides.

Improvised stove using aviation gasoline

**Improvised sto
using wick to b
oil or animal f**

Food and Water

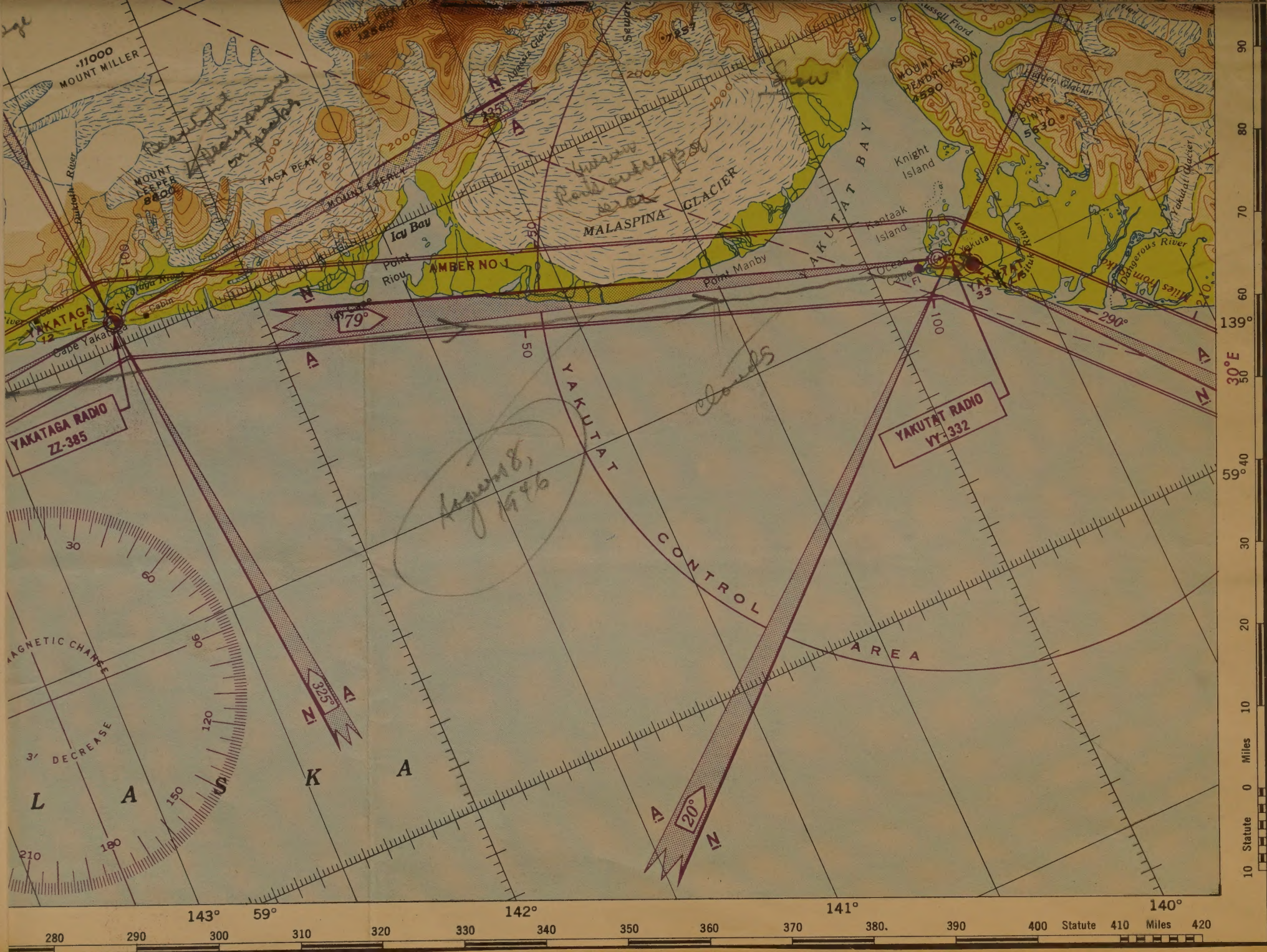
EMERGENCY RATIONS. Officer-in-c
Go on half rations by end of first week un
travel is in prospect, save light conce
K-Ration unit (1 meal—1100 calories) per
alive provided you stay fairly inactive.
need at least 2000 calories per day—and m

NATIVE FOODS. Practically all na
eat. However, living off the country, esp
can easily burn up more energy searching
you get it. Depend on your emergency ra
on keeping warm; avoid wasting energy; v

ANIMALS. Small animals, such as le
and porcupines are easier to get than lar
along runways in brush or snow and ar
them. Make trap arrangement look na
be killed with a club; look for thei
evergreen trees. Stalking is essential t
easy; keep downwind and out of sight.
following: moose—generally found in tim
of lakes and rivers; carbiou—found roamir
bear—widely distributed.

BIRDS. Grouse are found in timber,
like to stay on the ground and are easy to
snared or sometimes killed with a clu
obtained in the river valleys.

FISH. Probably your best bet for
streams and lakes. They are easily hooke
winter, fish through a hole in the ice. A
including lures made of feathers, pieces
hooks and use lines made of chute shro
traps and set nets along streams. If you
one time, smoke and dry the surplus.


MOUNT MILLER
11000
MOUNT LEEPER
8400
YAGA PEAK
MOUNT ESERAL
Icy Bay
Point Riou
MALASPINA GLACIER
AMBER NO 1
Point Manby
YAKUTAT BAY
Knight Island
Kanlaak Island
MOUNT PENDRICKSON
4590
PINTA
5530
Yakutat
Dangerous River
YAKATAGA
12 LF
Cape Yakataga
YAKATAGA RADIO
ZZ-385
YAKUTAT RADIO
VY-332
YAKUTAT CONTROL AREA
079°
325°
290°
20°
139°
30°E
59°
143°
142°
141°
140°
Statute Miles
MAGNETIC CHANGE
3' DECREASE
L A S K A

AERONAUTICAL SYMBOLS
JUNE, 1945

LANDPLANE FACILITIES

LANDPLANE BASE-MILITARY (COMPLETE FACILITIES) ___

LANDPLANE BASE-CIVIL (COMPLETE FACILITIES) _____

LANDPLANE AIRPORT-MILITARY _____
(REFUELING AND LIMITED REPAIR FACILITIES)

LANDPLANE AIRPORT-CIVIL _____
(REFUELING AND LIMITED REPAIR FACILITIES)

FLIGHT STRIP (LIMITED OR NO FACILITIES) _____

LANDING FIELD (LIMITED OR NO FACILITIES OR LOGISTIC INFORMATION NOT AVAILABLE) ___

SEAPLANE FACILITIES

SEAPLANE BASE-MILITARY (COMPLETE FACILITIES) ___

SEAPLANE BASE-CIVIL (COMPLETE FACILITIES) _____

SEAPLANE BASE-JOINT MILITARY & CIVIL _____
(COMPLETE FACILITIES)

SEAPLANE AIRPORT-MILITARY _____
(REFUELING & LIMITED REPAIR FACILITIES)

SEAPLANE AIRPORT-CIVIL _____
(REFUELING & LIMITED REPAIR FACILITIES)

SEAPLANE AIRPORT-JOINT MILITARY & CIVIL _____
(REFUELING & LIMITED REPAIR FACILITIES)

SEAPLANE EMERGENCY ANCHORAGE _____
(LIMITED OR NO FACILITIES OR LOGISTIC INFORMATION NOT AVAILABLE)

THE LENGTH OF LONGEST RUNWAY IN FEET IS INDICATED BY THE INNER CIRCLE OF EACH SYMBOL THUS:

○ 2500-3499 ◔ 3500-4499 ◑ 4500-5499

◕ 5500-6500 ● OVER 6500 ⊙ LENGTH UNKNOWN

LIGHTING FACILITIES

AVIATION ROTATING BEACON _____

AVIATION ROTATING BEACON (WITH CODE) _____

AVIATION FLASHING BEACON _____

AVIATION FLASHING BEACON (WITH CODE) _____

AVIATION BEACON (WITH COURSE LIGHTS) _____

OBSTRUCTION LIGHT _____

NIGHTLIGHTING FACILITIES _____ LF

LIGHTS (SURFACE NAVIGATIONAL) _____

F-fixed, Fl-flashing, Occ-occulting, Alt-alternating, Gp-group, R-red, W-white, G-green, B-blue, Sec-sector
Alternating lights are red and white unless otherwise indicated.
Lights are white unless colors are stated.

MOORING MAST _____

LINES OF EQUAL MAGNETIC VARIATION _____ 26°E

INTERNATIONAL BOUNDARY _____

K'UN-MING CONTROL

FLIGHT CONTROL AREA BOUNDARY _____

EASTERN AIR DEFENSE ZONE

AIR DEFENSE ZONE OR VITAL DEFENSE AREA BOUNDARY _____

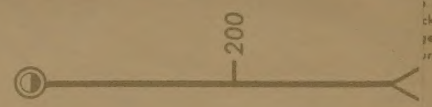
AIR NAVIGATION HAZARDS _____
(HATCHING OR STIPPLE TO BE SHOWN ONLY AROUND BORDER OF RESPECTIVE AREA UNLESS AREA IS RELATIVELY SMALL)

RADIO FAN MARKER _____

AERO

← MARRAKEC SH

FLIGHT COURSE



(STATUTE MILES BE

53° MAG →

CIVIL AIRWAY _____

RADIO RANGE COURSES _____

RADIO RANGE (WITH VOICE FACILITY) _____

RADIO RANGE (WITHOUT VOICE FACILITY) _____

RADIO DIRECTION FINDER STATION _____

RADIOBEACON _____

DF AND RBN LOCATIONS _____
(DF AND Rbn SYMBOLS WILL SHOW RESPECT OF FACILITY WHEN ADJACENT TO AIRFIELD

RADIO COMMUNICATION STATION _____
(ABBREVIATION DF AND Rbn IN UPPER MARGIN OF BOX, INDICATES DIRECTION FINDER OR RADIO BEACON FACILITY AT COMMUNICATION STATION)

FACILITIES AVAILABLE AT AIRFIELD _____
(RADIO FACILITIES INSTALLED FOR AN INDIVIDUAL AIRFIELD MAY BE SHOWN IN CONSOLIDATED FORM)

RADIO BROADCASTING STATION (WITH FREQUE

RESCUE BOAT _____

large glaciers (Bering) come nearly to the area. This area has been surveyed only a very short distance in from the sea. Between Icy Bay and Yakutat Bay I see the large Malaspina Glacier. There is much serac and many rock outcrops through it.

We come into Yakutat at 9:06 a.m. with a very low ceiling and rain and fog. This delta is low, flat, and imperfectly drained, but not wet. At the airfield the soil has a gravelly substratum. We are in the air again at 9:16 a.m.

As we leave Yakutat we rise immediately over a heavy cloud bank. We see only the high peaks (like Mt. Fairweather) along the coast. We turn toward Juneau near Cape Spencer. The clouds break a little to give glimpses of rocky, forested islands and of boats in the sea. The ceiling is low and we fly very low over Mansfield Peninsula and from there to the Juneau airfield. As we come in, we can see cows pasturing in the wet tidal flats near the airport. We land at 12:36 p.m. (2 hours faster than Anchorage).

Ellis goes into Juneau. I walk up the road a bit for lunch, and back to wait for the Pan American plane, late out of Fairbanks.

Near the airport are some dark-colored soils on terraces - fine sandy loam over gravel - suitable for gardens. I look over one fair garden, weedy and poorly cared

for. In the adjoining woods are many fine old spruce trees, 20 to 32 inches in diameter.

In the afternoon the airport fills up with a noisy crowd of some cannery officials and foremen returning to Seattle. My plane comes in and I leave about 4:45 p.m.

We fly over a nearly complete cloud cover until darkness.

Now Alaska is only a memory to me. This has been a hard month, but I can't recall ever getting more done in the same length of time. I was in the field almost constantly and had few worries over transportation, quarters, or other details . For those conveniences I am especially in debt to Dr. Aamodt. He and other members of the party also helped with soil samples, vegetation samples, and in many other ways.

As we approach Seattle one sees a complicated pattern of lights in the city, along the coast, and at sea. We are down at Seattle at 10:45. But it is midnight when I get into the city and to bed.

Return to Washington

August 9 at 9:15 a.m. I leave Seattle and arrive at Minneapolis at 10:30 p.m.

I then stop in Rochester, Minnesota at the Mayo Clinic for a check up of my back, and I get put into St. Mary's Hospital. It certainly seemed good to get relief from the almost steady pains of the previous 5 weeks - but that is another story. After leaving Rochester I stopped one day at the University of Wisconsin for a conference with Professor Truog, and reached Washington 8:00 p.m. Sunday, September 1.

Some reflections in the quiet of St. Mary's Hospital General

1. Affairs in Alaska are largely controlled by commercial interests in Seattle and by offices of Federal agencies in Washington. Apparently the Seattle Chamber of Commerce does a fairly effective job of coordinating the commercial interests, wholly in the interests of Seattle. Of course, the Federal agencies - Interior, Commerce, Navy, Agriculture, Army, etc. - are not together on policies and programs; in fact there is much confusion and competition among them. The commercial interests are so strong that Alaska citizens are looking more and more to the Federal agencies for help. Unless the serious citizens of Alaska can get together and develop a forward-looking program, and coordinate the activities of the Federal agencies, I doubt the situation will improve. I believe the chances for good government and long-time planning would be greater if Alaska were made a State.

2. It is a great pity that the exploitation of Alaska's greatest resource - fish - gives little for the development of the community. Workers for the canneries are recruited from Seattle, shipped to Alaska for the short summer season, and paid after their return to Seattle. Gold mining does leave more; but apparently

this is controlled largely by non-residents. Almost no taxes are paid by these industries to Alaska. Apparently the outside interests want Alaska to remain exactly as it is, without strong universities, independent citizens, reasonable power rates, and good, reasonable transportation.

3. The whiskey problem has been discussed in these notes. It is an extremely serious one because outside and inside interests both make so much easy money from it. Unless this problem is solved, other programs, for health, education, and good living are likely to fall short of significant success.

4. Better coordination of Federal policies, which I think can only come from strong local government, is urgently needed. But in addition, many Federal agencies, including the Congress, need some way to take local conditions in Alaska into account more in developing general laws and regulations. As a simple example among many: luxury taxes on fur clothing and things like duffle bags (luggage!), as applied to most of Alaska where they are prime necessities for normal living, are absurdly unjust.

5. Wonderful opportunities exist for a great university in Alaska, including especially cooperative programs with other American universities, and with Federal research

agencies, for graduate training. In several fields graduate students could get part of their training in a university in continental United States and a part, including their research, could be done in Alaska. Examples include astronomy, physics of cosmic rays, meteorology, soil science (especially on Tundra and permafrost), geophysics (now before the Congress), plant physiology and genetics (especially in relation to light and hardiness), anthropology, ethnology, geology (mining and glacial), as well as others.

But the salaries of the staff should need to be relatively higher than now and especially must tenure be more certain. The internal governing of the university should need to be more democratic with increased freedom for individual scholars in the selection of problems and use of funds.

Such a university would, of course, assume a high standard of scholarship and research. It would have a staff in excellent position to work with other scholars of Canada, Northern Asia, and Northern Europe on scientific problems, both fundamental and applied, peculiar to the Arctic and far-northern lands.

6. A lively tourist business could be developed by men with both vision and capital. After all, scenery rather than fish, gold, and furs, may be Alaska's greatest

resource. With good hotels, managed to cater to American city tastes, along with rapid transportation, I believe many people would come to Alaska. Indirectly, such a development would help Alaskan agriculture.

7. The people I met in Alaska were friendly individualists, like those of most frontiers. They are exceedingly hospitable. But it is a little hard for them to cooperate together on some major program because that always requires some compromising of opinion and loss of individual freedom of action. Business interests, with modern "know-how", of course, stimulate dissension among local citizens, usually without their awareness. This was well illustrated by arguments and splits among the farmers in the Coop at Fairbanks and somewhat less so at Palmer. Before they can have a good program in the area, the real citizens of Alaska must become aware of these influences and learn to evaluate them and to work together for good government in their own interest.

8 The question so often asked: "I should like to live in Alaska, what do you think?" "Yes, if you <u>know</u> Alaska - the opportunities <u>and</u> the handicaps, and if you are in good health, like winter sports, appreciate mountain scenery, don't require all the latest gadgets of Main Street to be

happy, and can take care of yourself. Don't go without money and expect to start a farm or business. For a farm you should have not less than $5,000 and it would be better to have $15,000. Don't take your family or burn your bridges behind you, until you have looked the area over. Don't go if you cannot get on well with people, or if you get lonesome easily. You will be much more likely to like Alaska if you are young, without deeply intrenched habits to be changed."

Agriculture

1. The total amount of land really suited to farming in Alaska is small. The areas near Palmer and near Fairbanks, although small, will remain the most important. I didn't see the Homer area, which may be good. Dr. Nygard saw the Copper River area and was not impressed. Yet there are small areas in many, many places where gardens may be grown - even to a point approaching part-time farming (really gardening with combined greenhouse, cold frames, and open plots) as near Anchorage. My present opinion, which may be modified by further study and reflection, is that most estimates of the amount and productivity of arable soil in Alaska are far too high. This doesn't mean that a lot of land could not be developed if the need were desperate. It could along the Yukon and elsewhere. There is a large area,

for example, that could be used west of Circle. But I cannot see the possibility of such a need for Americans for a long, long time.

2. I doubt that any significant export of agricultural products will be developed in Alaska. Possibly some specialities might; even now some seed potatoes are shipped out. But mainly agriculture will be for local consumption - as a supplement to other activities: fishing, mining, fur trapping, logging, tourist trade, communications, including military, and military establishments. Those products most expensive and difficult to ship have emphasis, like vegetables, fruits, dairy products, poultry, and meat. So far cereals are grown chiefly for animal feed. Possibly flour will be made locally to a significant extent later.

Predictions that Alaskan agriculture must become, and can become, efficient enough to sell products for prices like those on the general markets in the States are wrong, in my judgment. Now they get the Seattle price plus freight, either ship and rail, or air, depending upon the products. Of course, these rates are too high and should come down. The farmers can meet that much reduction in price because their machinery, fertilizer, and other supplies would cost less.

3. Under our economy, an increase of agricultural production in Alaska beyond local market demands would bring very serious problems of price and marketing, with demands for strict controls. But that much increase is not likely, except, perhaps, for a few individual items.

4. Rapid unguided settlement on land will be a cruel disillusionment for many families. It takes a lot of work to clear land - nearly as much for poor soil as for good soil. Settlers who get on poor soil can spend their savings and energy for nothing. I'm much afraid this will happen, because of the wrong over-optimistic maps and books that may fall in the hands of people looking for a new opportunity and who do not realize the importance of land quality. And it is such a pity! Modern soil scientists can now predict the potential productivity of soil before it is cleared with considerable accuracy.

5. Although Alaska has range resources, these are easily, and have been, overemphasized. It is true that fair to good range exists in many places that could be used for 4 summer months, IF winter feed were available. That is a big "if." Further the casual observer, especially in a plane, is very likely to mistake green dwarf shrubs, which grow in great abundance over a large part of the area, for grass.

Agricultural research

Agricultural research is badly needed in Alaska to maintain good living standards for existing farmers, to guide new settlement, and to help gardeners and part-time gardeners-farmers in the towns and villages, as well as in the country. They haven't the great back-log of knowledge gained through experience and research that we take for granted here in the United States - right in this county of Minnesota, for example.

Some important testing and observational research has been done by the Agricultural Experiment Station at the University, but essentially no fundamental research, which must come prior to application. Of course, farmers in Alaska get a good deal from bulletins and books written in the States; in fact, their resourcefulness in interpreting the general agricultural literature in terms of their own problems is amazing. But many problems peculiar to Alaska must be studied there. These are the ones that should receive emphasis.

In all thinking about soil-plant relationships in Alaska the shallowness of the true soil solum (regardless of the total depth of fine soil material), the low temperatures of the soil a few inches beneath the surface, whether frozen or not, the shallowness of roots, the great importance

of soil organic matter, and the need for rapid warming for early nutrient supply, must be kept in mind. Further, one could scarcely over emphasize the contrast in soil climate and environment between virgin and cultivated soil of the same type.

No one can believe more than I do in the general soundness of cooperation between the Department and the State (or Territorial) Experiment Stations in the conduct of both fundamental and applied scientific research. I should dislike to see the proposed research program by the U. S. Department of Agriculture in Alaska set up completely independent of the University. At the same time, research funds spent under the direction of people without the essential basis of understanding of the scientific method would not accomplish their purpose. I'm afraid, without meaning any criticism of personalities or of affairs that are none of my concern, that would be the situation in the University of Alaska. Of course, the Federal government, directly or indirectly, has more concern with the administration of the Experiment Station there than with one in a State. How much that alters the administration problem, I don't know. How representative the University is of Alaskans, I cannot say, but the farmers are quite generally dissatisfied, primarily

because of the superficial character of much of the work and failure to recognize their unique problems.

What are some of these problems? Here are some of the most important, not in any definite order:

1. Soil classification is urgently needed. (Perhaps I could be expected to put this first, but it certainly has equal importance with the first few listed and I can't list them in any absolutely "true" order because I don't know it.) It is needed primarily as a basis for classifying the experience available, which is, after all, considerable, as a basis for outlining and planning much other agricultural research, and as a basis for recommending settlement, as well as for the several other familiar uses.

The classification needs to be detailed in order to reflect the variations significant to crop adaptability and management practices. Detailed mapping, on a scale of about 3 or 4 inches to the mile with air photographs, should begin in the most highly developed agricultural areas, especially near Palmer[1/] and Fairbanks and perhaps near Anchorage and Homer. During this initial period the classification needs to be worked out with detailed morphological

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1/ The SCS maps, while valuable perhaps, are not at all adequate.

and laboratory studies. Careful analyses of farmer experience and of such research results as are available need to be made and the results classified by soil types. As this work starts, work on soil testing, fertilizer and lime trials in greenhouse and field plots, crop variety plot tests, and tillage researches should be established on characteristic areas of the significant soil types, along with farm budget analyses.

It is highly important that this work be started in the settled areas where enough data will be available to characterize the responsiveness of the soils to management. Then the work may be extended to undeveloped areas and safe predictions made of their potentialities and management requirements.

The recommendations for other soil researches, mentioned later, are all conditional on having sound classification. Because of the lack of previous work only well experienced men should be assigned to soil classification in Alaska.

2. Research on proper housing for animals, for storage, and for effective, economical greenhouses is urgently needed. Farmers showed great interest in vegetable storage both on farms and at shipping points. (Mr. Edgar attacked this problem vigorously and will doubtless have excellent material on it.)

3. Much can be done to develop and improve varieties of fruits, vegetables, grains, and forage plants. By no means should this be confined to testing materials from the various States, Canada, the Soviet Union, and other areas, although such testing is in the picture. Fundamental research on the reaction of plant materials to the light, temperature, diseases and insect hazards, and nutrient conditions in Alaska is needed to develop fundamental stocks of known genetic nature. From these stocks improved plants can be developed.

4. There is a great need for fertilizer research to discover the optimum kinds and amounts for various crops on the different soil types. Commercial fertilizers are generally needed, certainly nitrogen, phosphates, and potash, and likely others. Great wastes of fertilizers and losses of production could easily be avoided if the essential facts were known. (A lot could be learned now by an analyses of existing practice in relation to soil type.)

Lime needs should also be investigated.

As this fertility work develops the use of "quick" tests for help in determining the fertilizer needs of specific field needs to be explored.

The need for nitrogen fertilizers will be "tricky" to get at. It appears that excess nitrogen reduces the

quality of celery, lettuce, potatoes, and perhaps other vegetables.

5. Farm management and costs studies by individual farm budget analyses are urgently needed. Very little is now known about the costs of producing various crops and livestock, alone or in combination, on different soils. With the information that could be developed, I'm sure that most farmers could reorganize their farms for greater efficiency. These studies should be extended to land clearing. They are essential to a proper evaluation of new practices that will be developed by the other investigations.

6. The whole problem of seed quality of the grains, vegetables, and forage plants needs attention. For example, could proper seed for Alaska of Siberian red clover be grown in northwestern United States to advantage? Many current sources of seeds in Alaska are not dependable as to germination or variety.

7. The quality of and value of livestock feeds needs investigation. Practically nothing is known about local pastures, hays, and other feeds. (Ellis will have much on this.)

8. Serious problems of animal diseases exist: I don't know what is needed in Alaska beyond the services of

well-trained veterinarians, but Dr. Kemper will.

9. The quality of locally grown human foods and the adequacy of local diets needs at least some attention. Evidence of malnutrition among Alaska farm families is not hard to find.

10. Likely some work on animal breeding, especially with dairy cows and poultry would be helpful but I'm not sure.

11. The problem of weed control deserves serious attention. Hand labor is too expensive. New mechanical and new chemical methods need to be explored and tested.

12. Investigation of crop rotations, in relation to the maintenance of soil organic matter, to the hazards of soil blowing and erosion, and to weed control are needed.

13. Since manure is not available on many farms, research is needed on the use of peat and composts for the maintenance of soil organic matter and for mulches.

14. Exploratory drainage investigations, especially on the imperfectly to poorly drained soils on the stream terraces near Fairbanks should be undertaken and, if promising leads develop, extended. The problem is complicated by the hard freezing in winter and the underlying permafrost.

15. Investigations are needed on tillage machinery, harvesting machinery, and land clearing. This work is chiefly a responsibility for agricultural engineers but needs to be closely cooperative with the soil scientists and farm management specialists, because of its importance to soil organic matter, soil blowing, soil erosion, and the physical properties of the soil and the need for cost analyses.

16. The work on mosquito control is promising and needs to be continued.

17. Some economic research on the local problems of marketing and cooperative management is needed.

18. Some attention needs to be given irrigation, especially sprinkler systems for vegetables.

19. Some attention needs to be given sewage disposal on farms, especially where there is permafrost.

20. Studies of soil erosion, in the Fairbanks area especially, are needed so better control measures may be developed. The problem is serious on the upland slopes during spring thaws.

Some attention needs also to be given to the control of gullies initiated by the melting of ice lenses and

blocks in the permafrost.

21. Further work needs to be done on cheap, effective methods for drying hay.

22. Several plant diseases were found by Magruder, Aamodt, and others. These need attention.

23. Special investigations for practices to grow vegetables and trees at distant military outposts in the Aleutians and in the far northern Tundra region would be promising for the development of some local supplies of fresh vegetables (and for ornamentation). If morale among the soldiers counts for much, such investigations would be highly practicable and should be undertaken at once, in my judgment.

Other research

Certain other investigations are needed by farmers that are not primarily the responsibility of the U. S. Department of Agriculture.

1. Permafrost investigations in relation to buildings, highways, drainage, and soil settlement are needed. Fortunately, the War Department has a program under way and it appears to be in good hands, locally now at least. The data will be very valuable to farmers.

2. Work on ground water, in relation to the location of wells, is urgently needed in the uplands of the Fairbanks area. Perhaps the U. S. Geological Survey could be persuaded to undertake it.

3. Whether research is needed or not I do not know, but the Army Engineers (Civil) should be asked to look over the Matanuska River near Palmer in order to make recommendations for controlling the banks.